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ABSTRACT

Six papers from the 1990 CAUSE conference's Track II, Challenges and Opportunities of Information Technology in the 90s are presented. The papers focus on daily funding and accountability problems, the related management of growth, and funding relationships in higher education. Papers and their authors are as follows: "Achieving Excellence in Academic Computing" (Paul K. Madonna); "A Distributed Microcomputer Based Model That Integrates the Planning/Budgeting Process for an Entire University - A Case Study" (Marshall E. Drummond, Douglas Vinzant, and Wayne Praeder); "Turning a Private Label Credit Card into a Multi-Function ID Card" (Thomas G. James and Bill R. Norwood); "Keys to Success for Senior Level Computer Managers" (Charles E. Chulvick, Frank B. Thomas, and Patrick Gossman); "Levelling the Playing Field - Ways to Set Priorities Among Competing Projects" (Lee C. Fennell); and "Administrative Resource Sharing Between Components of The University of Texas - Pilot Project and Future Directions" (William E. Stern and Annette R. Evans). (GLR)

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ED 363 217

Challenges and Opportunities of Information Technology in the 90s

Proceedings of the 1990 CAUSE National Conference

TRACK II

FUNDING AND ACCOUNTABILITY

November 27 - 30, 1990
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CAUSE 90
MIAMI BEACH
NOVEMBER 27-30, 1990

TRACK II

FUNDING AND ACCOUNTABILITY

Coordinator: William Joseph, Virginia Wesleyan College

Do we know what information technology is costing our institution? How do we determine what is needed versus what is desired? Papers in this track focus on daily funding and accountability problems, the related management of growth, and funding relationships in higher education.

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ACHIEVING EXCELLENCE IN ACADEMIC COMPUTING

Paul K. Madonna, Ed.D., J.D.

Sacred Heart University

Fairfield, Connecticut

Survival in the decade of the nineties will require a campus to achieve excellence in one or more areas. The resources of the computer hardware vendors are one solution to achieving excellence in academic computing.

The hardware vendor is likely to develop a partnership with a campus if the vendor's architecture, technology and software become the keystone of the academic computing plan. An RFP designed as a performance specification will encourage vendors to respond in support of the academic computing plans.

This approach allows the vendor to bring to the campus the critical personnel and financial resources necessary to achieve excellence for both the campus and the vendor. The selection process therefore turns on the amount of resources the vendor will commit to the campus and the extent to which the vendor's solutions achieve the level of excellence specified in the academic computing plan.

INTRODUCTION

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Let us now turn our attention to an analysis of this summary of developing a partnership between the hardware vendor and the small college and university.

The Goal

Within the area of academic computing, it is appropriate and logical for the small college and university to establish the goal to become the most sophisticated academic computing campus in its region for a teaching college or university with approximately a 2,000 full time undergraduate enrollment. Such a goal has as its objective the attraction of sophisticated computer students not only to sustain its enrollment objectives, but to establish the base for an enhanced academic computing environment. Such a goal also will energize and motivate current faculty who yet may not have achieved acceptable levels of computer literacy. Additionally, this goal will provide an attraction to draw new computer oriented faculty to the campus; not only computer science faculty, but faculty from all disciplines whose interest and future include the necessity of a computing environment.

The most important aspect in the decision to establish this goal is the commitment to enlist the expertise and financial support for such a program from the computer hardware vendors. This is the hallmark of this entire approach. The small college or university does not have the financial, technical or human resources to carry off this kind of quantum leap into the world of an advanced and sophisticated computing environment. Usually, the computing center staff will consist of a director who does possess significant expertise, but that person is generally torn between various and sundry technical and administrative

responsibilities that prohibit the devotion of his or her expertise to designing and implementing a sophisticated computing environment. The remainder of the center staff, usually three to five more people, are entry level professionals without the ability to either assume management of the center during a design and implementation phase or the ability to assist significantly in a design and implementation program.

The Plan of Action

When all is said and done, there still remains one small item to be accomplished: how to get from here to there! How to bring a campus with a mediocre or modest academic computing environment to the level where it honestly can be positioned as having the most sophisticated academic computing environment in the region for a small teaching college or university.

The plan of action that the college or university must complete before it makes any contact with hardware vendors is the development of a five year strategic plan, a five year plan for academic computing and a specific design for academic computing on campus.

First, the college or university must develop a strategic plan to demonstrate that it has its goals and mission clearly stated; and that these goals and mission show that this is a campus looking forward in an aggressive mode that places an emphasis on excellence in carrying out its mission and achieving its goals. The most important part of this five year strategic plan is its financial model. Without a financial model that projects enrollments, tuitions and expenditures, the five year strategic plan becomes an academic exercise in rhetoric and euphemisms. Even more importantly, academic computing must be clearly displayed in this financial model so that the hardware vendor is assured of the viability of the campus as a potential customer.

Second, the overall University five year strategic plan must devote a reasonable section to academic computing. However this will not substitute for an academic computing plan that is separately written and covers a period of not less than five years. Throughout the academic computing plan there must be a constant emphasis that this plan is a complete reordering of academic computing on the campus, with the design objective to be the establishment and acquisition of leading edge technology in all areas of academic computing.

Third, the specific design for academic computing that will serve as the link between the academic computing plan and the request for proposals should focus around the development by one

vendor of a central facility, a totally networked campus and departmental computing. The central facility is not a traditional computer center, but is a hub in a distributed system to handle high volume in complex computing as well as being a location for specialized hardware and software. The network will bring together every single space on campus into a design of universal connectivity in an open architecture format; and most significantly, the network will provide unlimited external access through the national and international computing network systems. While departmental computing plans may anticipate a variety of vendors, there must be the ability to access files throughout the network with restrictions to such files based only on policy and security reasons.

This design concept is a critical element in attracting the computer vendor to the campus and in developing a contract with that vendor. It is critical to interact with the vendor in a focused and highly specific manner in order to avoid vendor and university exchanges and agreements that do not include specific hardware, software and other support services associated with definite dollar amounts for each item. Therefore, we can summarize this first major phase of a university's attempt to achieve excellence in academic computing by stating that this goal means the establishment of a sophisticated computing environment in three components: a central facility, a universal network, and peripheral equipment, all operating in an open environment of connectivity and communication.

Campus Resources

As we move to detail of the specific approaches to attracting a hardware vendor to a partnership with the university, our analysis will no longer be academic or technical. From now on, our discussions will center on the financial. At a later point, we will address the interaction of vendor selection and hardware and software evaluation.

The campus has two basic resources to bring to the table upon which the partnership will be written: the computing expense budget and the computing personnel budget. The computing expense budget are those costs associated with hardware and software, such as, maintenance, licenses, and financing costs. These dollar amounts should be known and used as a basis for determining how much money the university can spend towards the accomplishment of its goal. The financial model in the strategic plan will have addressed the fact that these dollars will increase from the thirteenth month after installation of new systems until the end of the planning projection. The first twelve months of installation are generally under a warranty program that negates the need for any maintenance costs;

therefore such costs may be allocated to the acquisition of hardware and software.

The computing personnel budget, unlike the expense budget, must increase at the beginning of the installation of new hardware and software technologies. It would be an unusual situation indeed to find a small university computer center adequately staffed to provide the significant academic user support services that will be required to utilize the state of the art hardware and software that is arriving on campus. Simply stated, if this is not a component of the academic computing financial model, it is prudent not to proceed further. In order to quantify this factor and place it in proper fiscal perspective, the increase in personnel means one professional staff person devoted to academic user support services for the first two years of installation and one more similar person added to the staff at the beginning of the third year. Presuming one such professional already exists on most university campuses, this staffing presumes that the director will have three professionals to support the hardware and software needs of the academic users, including student users.

Vendor Resources

The purpose of a partnership with a hardware vendor is to augment the resources of the campus so that the two together - the vendor and the campus - may move the campus forward to achieve excellence in academic computing. So at the outset, the first resource in importance that the vendor brings to the campus is the simple fact that the vendor becomes a partner with the campus. By attracting the vendor to the campus, the campus is able to make a statement that we are in partnership with this major national computing vendor - and that is something special that sets this campus apart from others.

Secondly, however, to establish this necessary partnership, the campus must be flexible in the specific hardware and software technologies that it is seeking so that compatibility of university academic computing goals will not be in conflict with what major computer vendors are able to provide. A partnership is a mutual relationship where each partner contributes to the other and works with the other towards a mutual goal; if the campus is rigid and predetermined, they cannot achieve a partnership that will produce the maximum for the campus.

Third, a critical, and perhaps the least expensive, aspect of this partnership is the assurance by the vendor that the campus will have access to its engineers and always be considered as a beta site when it is appropriate and logical. If after all

of the efforts of a strategic plan, an academic computing plan, vendor selection and hardware and software installation, there is no commitment by either the campus or the vendor to continue to look to the horizon and upgrade and maintain the position of advanced technology, then the campus will quickly sink back down to the level of a mundane and pedestrian academic computing environment.

Fourth, the campus must insure that the vendor brings to the partnership the very latest leading edge hardware and software available; not what the vendor believes the campus is currently ready to accept. This whole process we have been reviewing can be perceived as a change agent. And simply to supply the campus with more of the same will result in just that - more of the same mundane and pedestrian computing. Not only must the vendor bring to the partnership the current state of the art, but plans must be laid for easy access to future upgrades.

Fifth, the major computer vendors have the very significant resource of being able to provide a variety of financing options for the acquisition of hardware and software. While not commonly referred to as financing options, the various lease plans should be thought of in that perspective so that we may feel comfortable in working with the selected vendor and adjusting the costs of acquisition and continued maintenance into a payment program that will meet the campus's particular budget requirements. One should think of the acquisition of hardware and software not as a purchase, but as a budgeted expense that can be projected into the future. This is not a static or simplistic calculation, such as a mortgage amortization schedule, but rather a complex negotiation that factors in such variables as delivery schedule, acceptance dates, financing charges and whether or not the institution may qualify for tax exempt financing. It is at this point that the vendor can make the program work or not.

Finally, a major national computing vendor brings to a partnership the enormous publicity that such an organization can generate. Whether it is publicity simply within its own client base, or in the rare few instances where the publicity is national, this is the kind of recognition that enhances recruitment of students and faculty as well as energizes the current campus community. Free surplus equipment from the local insurance company, bank or anyone else making such contributions not only does not satisfy the requirement for state of the art technology, but brings with it absolutely no prestige or publicity. Only the major vendors can bring this to a partnership. And for the small university, it requires the partnership aspect to obtain this vendor commitment; a simple sale of a few P.C.'s or a workstation on an irregular basis will not generate a partnership.

The Request for Proposals

Now that we know what we want to do and what we want to accomplish and the resources that we have to do it, all we have to do is do it! Easier said than done. The vehicle to accomplish the campus objective is the request for proposals. Normally, these requests are a statement to the vendor of what is desired and the response from the vendor is how much it will cost.

In developing a partnership to achieve excellence, we instead should make the request for proposals an open invitation to all vendors to respond to our goals and expectations as we have defined them. Put another way, the small university should write a performance specification instead of attempting to specify in detail hardware that it wishes.

Yes, the request for proposals has to include all of the administrative and legal boiler plate that is common and available. But once that is over and done with and duly entered into the bound version, the most important aspect of the request is a full presentation of the academic goals and a clear invitation to the vendor to design solutions towards that academic goal. To repeat what was stated earlier, the academic goal states that the university wishes to become the most sophisticated academic computing environment in the region for a teaching university under 2500 students. It anticipates accomplishing this objective by developing a central computing facility, a totally networked campus and providing to faculty and students appropriate and state of the art peripheral equipment such as P.C.'s, workstations, terminals and printers. While this does become expanded in a full request for proposals, that theme is repeated over and over again to the vendor, always concluding with the question: what is your design solution for our campus. Emphasis must be made that the campus anticipates a design solution that presumes a full partnership with the vendor.

A critical aspect of the request for proposals is the evaluation process that will be utilized by the campus. The vendor should know ahead of time that it will be an open process in which the two main evaluative criteria will be vendor technological creativity and vendor financial creativity. This is an evaluation process that places weight on the whole solution as opposed to individual segments.

Besides total cost and financing options, warranty and maintenance are clearly major financial issues. Therefore, the request for proposals should specifically request that the vendors address options to reduce these financial burdens; invite extended warranties and reduced maintenance cost programs.

When all is said and done, we come to the critical question of how do you choose one vendor over another. First, the choice should be a ranking based on technology and design solutions to the performance specifications. The process for doing that is not the intent of this presentation.

Rather, we are concerned with the second focus of competition: the total cost of the whole project. The project is the central facility, the network and peripheral equipment. Add it all up and there is a total cost. To that cost must be added maintenance. Subtracted from that cost is the grant support that comes from the partnership. When all is said and done, a partnership means, among other things, that the vendor will provide greater than normal discounts or free hardware and software. Let me hasten to add that the partnership will provide many other options that we have described above; but at this stage we must be price sensitive. We have ranked the vendors by their technological solution and have determined which would provide acceptable solutions to the campus goal of achieving excellence. Now to state it again, we are at the price sensitive stage whereby we will enter into a partnership with the vendor who provides the hardware and software for our needs at the lowest price.

The critical element in a negotiation that will take place at this stage between the two or three vendors ranked highest based on technology is that the campus negotiators be open and honest with the vendors. The vendors must understand that the campus has reached a decision where vendor A, B and C would all be acceptable. Therefore, the only issue remaining for discussion is the bottom line. The bottom line is more important than however the vendors wish to price individual items. An extra year of warranty is a deliverable for which there is no charge and reduces the bottom line. A positive response from the vendor to provide hardware and software for specific programs means that a specific amount of peripheral equipment is delivered free or at a greater than normal discount.

After a round robin process of dialogue with each vendor to determine what their actual lowest price will be is complete, then the choice is made for the lowest price. If the total prices are all very close, perhaps within $20,000 to $30,000, than the choice should revert back to technological factors that differentiate one vendor from another.

<u>The Balance and the Choice</u>

What we have tried to accomplish is to place the small college or university in the same bargaining position as major research universities. The hardware vendor does not sell the

product to the entire research university all at once. Rather, each program or department in the university operates almost as an individual customer, able perhaps to spend a half a million dollars a year with the support of university and sponsored research funds. With this approach for the small college and university, we have said to the hardware vendor that we will buy from you the entire computing solution that you have designed so that we may achieve our goals of academic excellence. We have said to the computing vendor that here is our academic computing goal and our basic performance specification - how would your company fulfill this performance specification? In this way, we become a large customer in much the same way as a department or division in a major research university - we too will spend in excess of a half million dollars in this year.

Case Study: Sacred Heart University

Sacred Heart University is a small independent teaching university located in Fairfield, Connecticut. It has approximately 1400 full time undergraduate students, 1800 part time undergraduate students and 1100 part time graduate students.

Sacred Heart University has taken an aggressive posture that it will achieve excellence within its mission to serve the students of Connecticut and the surrounding northeast region. The University believes that for each student it accepts, it will attempt to provide an excellent education, whether in basic studies, the humanities, business or science. In short, the goal of the University is to achieve excellence as a teaching university.

Sacred Heart University has a five year strategic plan that states its mission and goals. It is a public document and has become the core of the University's decision-making process. When decisions are made, the University asks how does this relate to the strategic plan.

In the Spring of 1989, the University formed an academic computing committee to write a five year plan that was completed at the end of 1989. That plan was considered as a subset of the University five year strategic plan. Thus, they are intertwined and support one another. Most importantly, the financial modeling in the strategic plan included funding of academic computing over and above inflationary increases.

To bring this academic computing plan to life, the University issued a request for proposals that followed the precepts described previously. The University received responses from seven nationally known computer vendors who provided total solutions to its performance specifications.

The Academic Computing Committee evaluated those seven proposals and recommended further review of three of them. Following that further review, two were selected by the Academic Computing Committee and the University Administration as being equally acceptable as partners with the University to achieve our goals of excellence.

Negotiations are underway with these two vendors, with the final decision resting entirely upon price.

No matter which of these two national vendors the University selects, we will have made the correct choice of a partner. Sacred Heart University brings to the partnership its aggressive posture in seeking excellence in academic computing. The selected vendor will bring to the partnership all of its hardware, software and engineering resources as well as a commitment that the University will be offered the opportunities to be a beta site for the development of appropriate new hardware and software.

The process works and Sacred Heart University will move from having a pedestrian mundane computing environment to having one of the most advanced academic computing environments in the northeast United States.

A DISTRIBUTED MICROCOMPUTER BASED MODEL THAT INTEGRATES THE PLANNING/BUDGETING PROCESS FOR AN ENTIRE UNIVERSITY-- A CASE STUDY

Marshall E. Drummond
Douglas Vinzant
Wayne Praeder

Eastern Washington University
Cheney, Washington

Attempting to integrate the various planning and budgeting processes that normally are found on a university campus is a challenging and often, very difficult undertaking. At Eastern Washington University, strong leadership on the part of the university's president and provost and a micro-computer based model have enabled the organization to take a giant step forward toward realizing that goal. The computer model placed a fairly sophisticated analytic tool in the hands of the departmental planners with which alternative strategies could be evaluated over a multi-year time frame. This study explains how the computer model fit into the overall planning process of the university and evaluates the effectiveness of its use.

A DISTRIBUTED MICROCOMPUTER BASED MODEL THAT INTEGRATES THE PLANNING/BUDGETING PROCESS FOR AN ENTIRE UNIVERSITY—A CASE STUDY

"The "new" strategic plan, and planning process, must necessarily be "bottom-up." Assessing the ability (and necessary skills) to execute-to be responsive, flexible, attentive to customers-starts on the front line. Obviously, as the process moves forward, it will involve debate among senior officers, and compromise. But it should never lose touch with or sight of the front line, where execution takes place."

Tom Peters
Thriving on Chaos

INTRODUCTION

Following a period of expansion in the '70s and early '80s, Eastern Washington University began to feel the pinch of that expansion in the form of an overextended budget. There was also a change in presidents at the university. External to the university, but at about the same time, the State of Washington through the Higher Education Coordinating Board had developed a master plan for public higher education, including the identification of long range program parameters for each of the state's public universities. The result of these internal and external conditions was a great deal of uncertainty within the university about what directions the university would pursue and how it would go about doing so.

To address this problem, the university under the leadership of the president and provost set out to clarify what the university would try to achieve over the next several years and to gain consensus within the university on how that should be done. The vehicle they chose to accomplish these ends was, not surprisingly, implementation of a strategic planning process. And so, in the last several years, the administration in consultation with faculty, staff, and students has rewritten its mission statement, clarified programmatic responsibilities, and consolidated previous gains in an effort to better prepare the university for the future.

This paper provides an overview of the process utilized by Eastern Washington University to bring about the redirection of the university. Particular attention is devoted to the microcomputer based model which has been the key to successful integration of the university's planning and budgeting processes.

UNIVERSITY PLANNING/BUDGETING PROCESS

University process

As noted earlier, the State of Washington through the Higher Education Coordinating Board had provided some very broad directional statements for Eastern in the master plan for higher education. In concert with the directions established in the master plan, the university began to develop a statement of widely accepted and supported goals for the

university in the fall of 1988. As a result of those efforts, three goal categories were identified:

1. learning;
2. student development; and
3. university management.

In addition, goal statements and critical success factors were identified under each of these categories. These statements provided overall direction for the university and laid the foundation for initiating a comprehensive planning process in the 1989-90 academic year.

Stages of development

To address the need for faculty and staff participation in developing and implementing the university's plans, a process was designed which can be characterized as a "bottom-up" approach. In other words, to achieve the desired broad-based participation and consensus, the process was designed to occur in four developmental stages:

1. department plans;
2. college or division plans;
3. vice presidents' plans; and
4. university-wide plans.

In this four-stage, "bottom-up" process, plans are rolled up to the next higher level, where they become the basis for developing the succeeding level's plans. The process continues until the final university plans are completed and adopted by the university's Board of Trustees. This approach enables all constituent groups in the university community to express and promote their values and priorities in shaping the university's agenda for the planning period.

Expected Outcomes

The planning process was initiated with the expectation that a number of products would result from its implementation. The most tangible outcomes of the process are program plans and budgets at department, college or division level, vice presidents, and university level. At each of the four developmental stages, plans have been produced which include: vision narrative - a description of the program as it will exist at the close of the six year planning period; strategies - the key actions or decision points which must be implemented each biennium of the plan period to bring about the changes called for in the vision narrative; and operational plans - the resource requirements (operating and capital) necessary to implement the strategies.

The operational plans are developed using the micro-based resource requirements model and essentially represent the annual operating and capital budgets required to implement the program directions identified in the vision narrative and strategies. This is a critical aspect of the university's process which differentiates it from most attempts to link planning and budgeting. Rather than going through separate exercises for planning and budgeting, we have integrated the two; the tool we have utilized to accomplish this

integration is the resource requirements model.

Typically, universities have planning processes which are separate and distinct from the budget process. It is this separation which encourages decision-makers to be unwilling to make hard choices in the planning process in the same manner that they must be made in the resource allocation process. Often, the result of this phenomenon is that plans are adopted requiring resources far beyond those available to the university. As a result, when the budget process begins, the plans are set aside and decisions are made with little or no reference to the plans.

With the demographics of the later part of this decade soon to be upon us, effective planning for replacement of faculty members is critical to the viability of the university. The plans under development will enable the university to evaluate where anticipated vacancies will occur and initiate appropriate recruiting measures to replace retiring faculty.

The information derived from the process for information technology and facilities will also be used to develop a campus technology plan and a campus facilities master plan. These efforts are commonly not integrated into a university's planning process; they are more likely to be operating separately, leading to decisions which are not in agreement with one another in the choice of program direction, technology requirements and facilities needs. By including these key elements in the overall planning process, the university hopes to achieve an integration of program planning, information technology planning, facilities planning, and budget development.

In addition to the tangible outcomes which the plans and budgets represent, there have been a number of very significant intangible outcomes of the process. Some examples include: development of a broad base of understanding and support for the directions established for the university; and the incorporation of longer term programmatic goals in short term operational decision-making processes throughout the university. In an organization as diverse as a university these outcomes are significant, yet difficult to achieve.

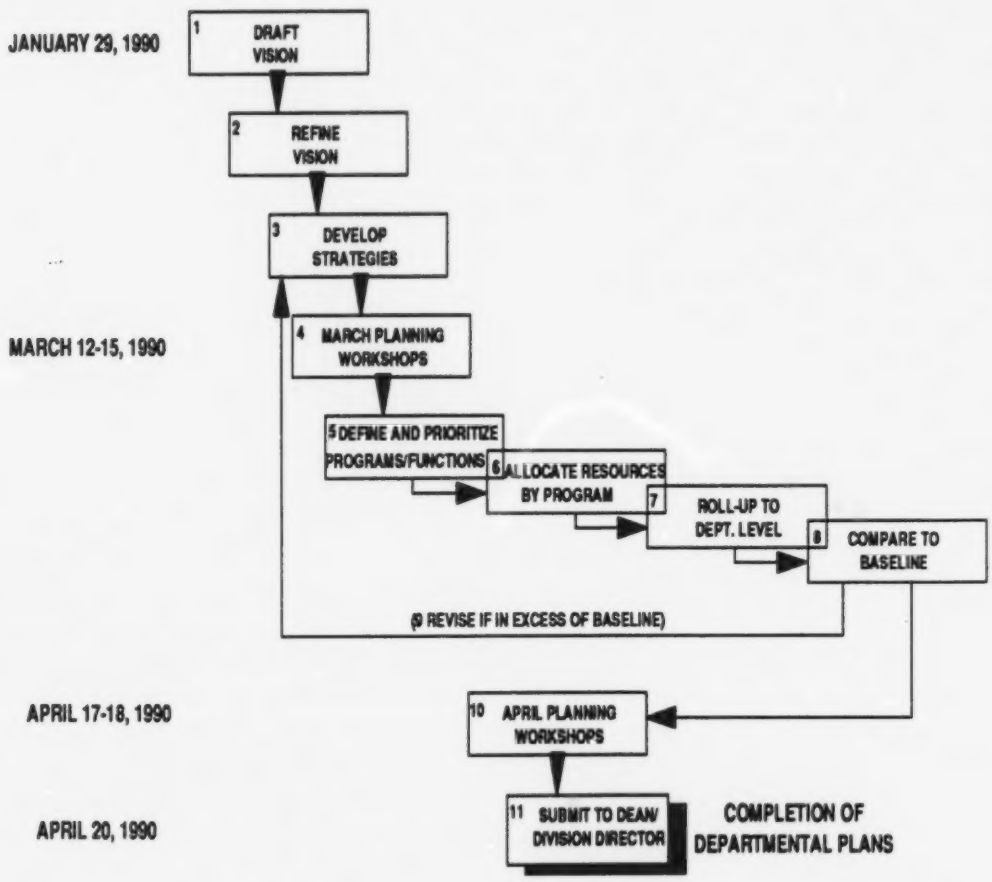
The next section describes the steps the departments went through in developing their plans and recommendations.

Departmental planning/budgeting process

Each department followed the same series of eleven steps in developing their plans; they are displayed in the diagram below.

EASTERN WASHINGTON UNIVERSITY
PLANNING PROCESS

I. DEPARTMENTAL PLANS


JANUARY 29, 1990
1 DRAFT VISION
2 REFINE VISION
3 DEVELOP STRATEGIES
MARCH 12-15, 1990
4 MARCH PLANNING WORKSHOPS
5 DEFINE AND PRIORITIZE PROGRAMS/FUNCTIONS
6 ALLOCATE RESOURCES BY PROGRAM
7 ROLL-UP TO DEPT. LEVEL
8 COMPARE TO BASELINE
(9 REVISE IF IN EXCESS OF BASELINE)
APRIL 17-18, 1990
10 APRIL PLANNING WORKSHOPS
APRIL 20, 1990
11 SUBMIT TO DEAN/ DIVISION DIRECTOR
COMPLETION OF DEPARTMENTAL PLANS

STEP ONE was development of the components of the vision narrative. STEP TWO was to ensure that the vision directly addressed accomplishment of university goals and did so within the parameters established by the university planning process assumption. STEP THREE required development of strategies for each biennium (two year period) of the six year planning period. STEP FOUR was a series of workshops which provided departments with the opportunity to discuss interdepartmental and intradepartmental program link-

ages. In addition, deans and division directors reviewed the progress of departmental plans and provided feedback on the directions being taken by departments. The greater the involvement early on in the planning process of senior managers, the less need there was of substantive changes in the plans at subsequent stages of development. These workshops were also used to introduce the resource requirements model to the planning process participants.

STEPS FIVE through EIGHT required use of the resource requirements model software (the model is discussed in greater detail in a later section of the paper). These steps include identification and prioritization of departmental programs or services as well as the resources necessary to support them. At this point, departments had completed their plans requiring resources equal to 1XX% of their baseline budgets.

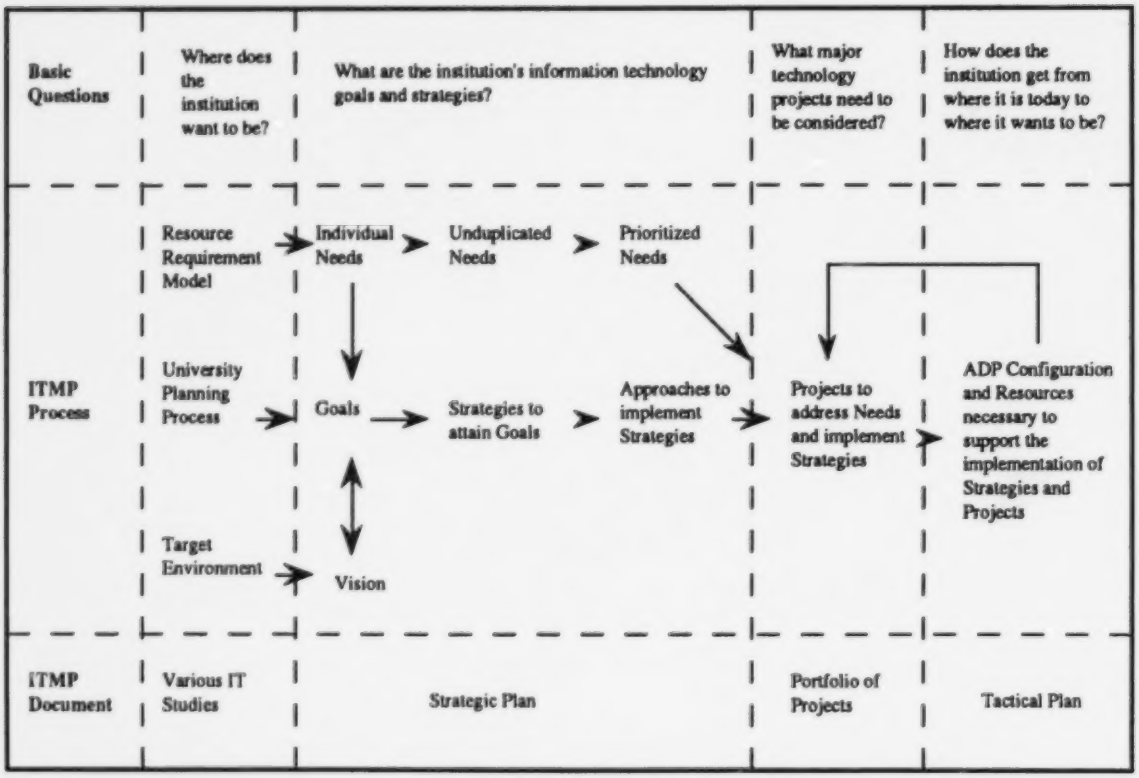
STEP NINE applied only to the 100% of baseline scenario. This meant going back to STEP THREE and reworking strategies and operational plans until they did not exceed the baseline funding amounts provided in the model. STEP TEN was a second series of workshops in which departments presented their final plans including: vision narrative, strategies (two scenarios - 100% and 1XX% of baseline), and operational plans (two scenarios - 100% and 1XX% of baseline). As a result of information received in the workshops, departments made any final modifications to their plans. STEP ELEVEN was the final step in the first stage of the university's planning development process. Departments submitted a complete set of their plans, including vision narrative, strategies, and operational plans (hardcopy and diskette) to their dean or division director.

The subsequent stages of development followed essentially the same series of steps as the ones outlined above, but were based on roll-ups of the departmental plans. When changes were made in the later stages of development, managers were required to go back and revise the departmental plans accordingly. This process required extensive dialogue between the different levels of management in the university.

Integration with information technology plan

The planning process for the use of information technology is often a stand alone process at many universities. The drawback of such a process is that the requirements or needs identification process usually is conducted by an information technology planning study team. In an integrated university planning process, the information on the individual functions requirements and needs are submitted up through the organization itself. This makes the aggregation of needs as well as the priority setting process much simpler. The following diagram shows how the IT planning process at Eastern Washington University has been integrated into the overall university planning process.

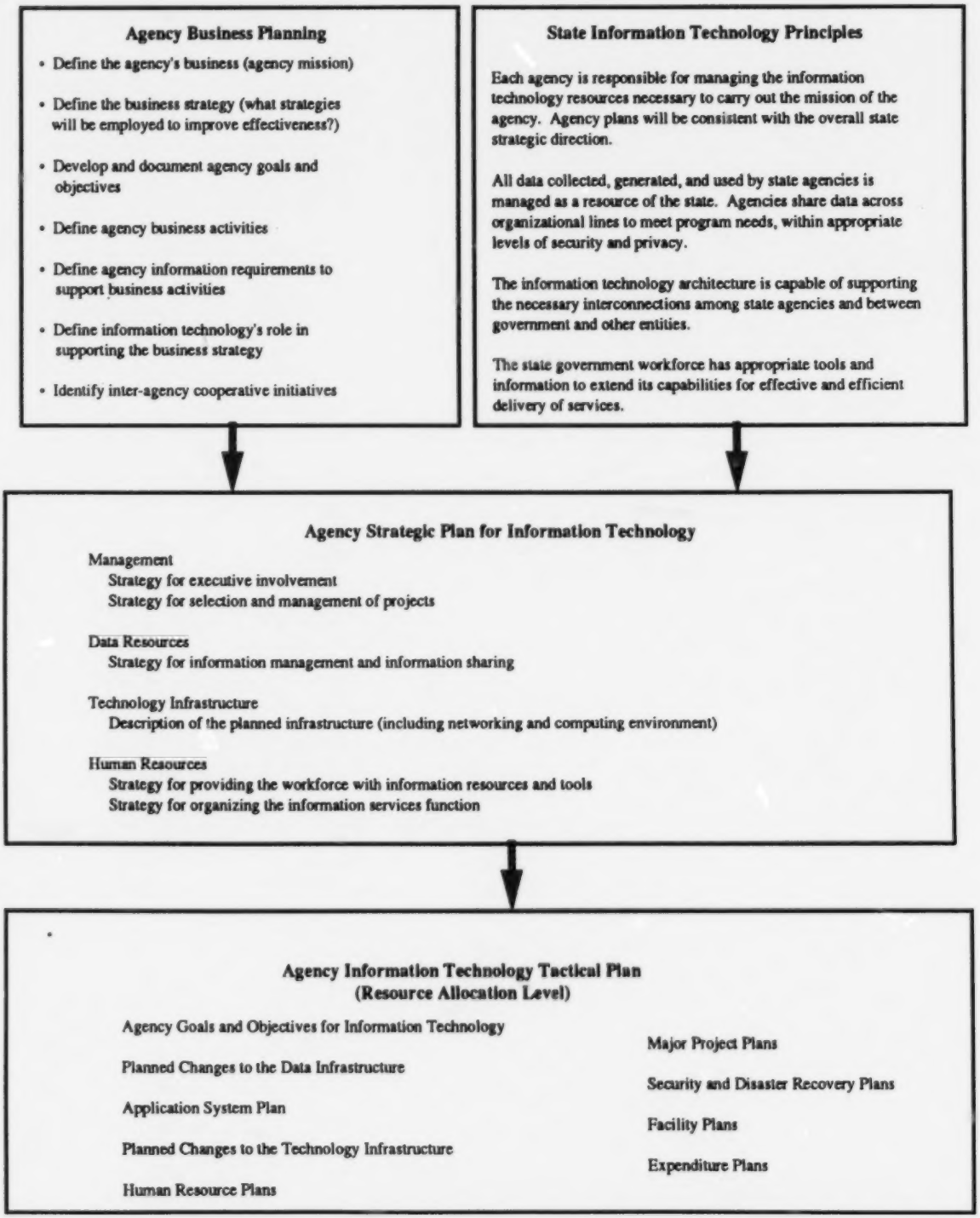
Information Technology Master Plan Paradigm


Basic Questions
Where does the institution want to be?
What are the institution's information technology goals and strategies?
What major technology projects need to be considered?
How does the institution get from where it is today to where it wants to be?
Resource Requirement Model
Individual Needs
Unduplicated Needs
Prioritized Needs
ITMP Process
University Planning Process
Goals
Strategies to attain Goals
Approaches to implement Strategies
Projects to address Needs and implement Strategies
ADP Configuration and Resources necessary to support the implementation of Strategies and Projects
Target Environment
Vision
ITMP Document
Various IT Studies
Strategic Plan
Portfolio of Projects
Tactical Plan

Even though it must lag behind the overall university planning process the IT plan results will be considered equally along with all the other organization units plans. Recommended priorities for technology projects for the entire university will be done by the university IT governance groups. The final information technology plan will follow a format and process similar to that commonly required within the State of Washington.

INFORMATION TECHNOLOGY PLAN

One of the goals of the information technology planning process is to integrate information technology planning with agency business planning. The following is the suggested format for technology plans from the State of Washington.


Agency Business Planning
• Define the agency's business (agency mission)
• Define the business strategy (what strategies will be employed to improve effectiveness?)
• Develop and document agency goals and objectives
• Define agency business activities
• Define agency information requirements to support business activities
• Define information technology's role in supporting the business strategy
• Identify inter-agency cooperative initiatives
State Information Technology Principles
Each agency is responsible for managing the information technology resources necessary to carry out the mission of the agency. Agency plans will be consistent with the overall state strategic direction.
All data collected, generated, and used by state agencies is managed as a resource of the state. Agencies share data across organizational lines to meet program needs, within appropriate levels of security and privacy.
The information technology architecture is capable of supporting the necessary interconnections among state agencies and between government and other entities.
The state government workforce has appropriate tools and information to extend its capabilities for effective and efficient delivery of services.
Agency Strategic Plan for Information Technology
Management
Strategy for executive involvement
Strategy for selection and management of projects
Data Resources
Strategy for information management and information sharing
Technology Infrastructure
Description of the planned infrastructure (including networking and computing environment)
Human Resources
Strategy for providing the workforce with information resources and tools
Strategy for organizing the information services function
Agency Information Technology Tactical Plan
(Resource Allocation Level)
Agency Goals and Objectives for Information Technology
Planned Changes to the Data Infrastructure
Application System Plan
Planned Changes to the Technology Infrastructure
Human Resource Plans
Major Project Plans
Security and Disaster Recovery Plans
Facility Plans
Expenditure Plans

DESCRIPTION OF THE DISTRIBUTED MODEL

Excel model

Components of the Resource Requirement Model

PROGRAM DEFINITION

This worksheet is used to identify all programs offered by the department and to identify requirements for these programs.

PROGRAM PERSONNEL STAFFING MATRIX

This worksheet is used to identify each person's role in all programs identified in the Program Definition worksheet. One Staffing Matrix is completed for each fiscal year.

FINAL RESOURCE ALLOCATION PROJECTIONS

This is a summary worksheet that identifies FTES/FTEF formula driven allocations and allocations entered on one or more of the exceptional resource allocation worksheets.

EXCEPTION RESOURCE ALLOCATIONS

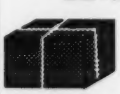
The exception resource allocation worksheets are used to itemize exceptional resources required for department programs. Any or all of the three exception resource allocation worksheets can be used by a department. Entries from these worksheets are automatically totaled in the Final Resource Allocation Projections worksheet the next time the Final Allocation worksheet is recalculated.

OPERATIONAL PROJECTS OR ACTIVITIES

PHONE COSTS

COPYING COSTS

PROFESSIONAL DEVELOPMENT



OTHER COSTS

GENERAL GOODS AND SERVICES

FACILITY PROJECTS OR ACTIVITIES

NEW PROJECTS

MINOR REMODEL

MAJOR REMODEL

TECHNOLOGY AND INFORMATION RESOURCES

EQUIPMENT - INSTRUCTIONAL

COMPUTING

TELECOMM

EQUIPMENT - OTHER

LIBRARY

The resource requirements model is composed of six different Microsoft Excel worksheets which are used by department managers to allocate resources for the department over the six years of the planning period. Although department budgeting and planning could be completed using paper worksheets, the resource requirements model is far superior due to its speed and accuracy; this is particularly true when managers wish to evaluate resource requirements of alternative strategies. The model is composed of six worksheets. These allow the department manager to identify annual budgetary requirements in each of the following areas :

1. Department programs (or functions) and their components;
2. Personnel requirements;
3. Operations exceptions (non-personnel requirements);
4. Facility requirements;
5. Technology and information resources requirements; and
6. Resource allocation projections (summation of inputs from #1-#5).

Two different resource requirement scenarios were developed by each department. The first, the 100% of baseline scenario, assuming that the same amount of funding they had the previous fiscal period would be available and the second scenario, the 1XX% of baseline scenario, assuming that funding above the baseline would be available.

EVALUATION OF THE FIRST ITERATION OF THE SYSTEM AND PROCESS

Process

Without question, the single most important factor to the successful implementation of this process was the support of the university's president and provost and their commitment to involving departmental managers in the entire development process from the outset. This point cannot be emphasized too strongly for universities considering implementation of a similar process.

It should also be recognized that this type of heavily participatory process requires a substantial amount of time and will not be successful unless it truly becomes a management priority which supersedes (at times) all of the other activities for which managers are accountable. The process is not one which can be started and finished in three months; it will require anywhere from twelve to eighteen months to complete the first cycle of the process due to the training and learning curves associated with the process.

Model

Probably the most obvious and important lesson in utilizing a computer model to assist in a planning/budgeting process is the need for matching user skills with the model's degree of sophistication. The balance that must be achieved is securing the amount and type of information necessary for decision-makers to make informed programmatic choices on the one hand while keeping the model from becoming so elaborate and complex that managers are unable to use it.

While the model enabled mangers at all levels of the organization far more accurate and sophisticated analysis of data, it required some basic understanding of micro-computer usage which was lacking in some cases. The result was that those managers who were unfamiliar with micro-computers had to develop their information by hand on hard copy and then have it keyed into the model. Managers who adopted this approach often did not use the model to do the "if.., then.." type of analysis available to them through the model.

One of the difficulties of using this particular computer based model had to do with the limitations associated with using a two dimensional spreadsheet package rather than a more sophisticated package such as relational database software. The problem once again, however, was the development time frame—which was very short—and user skill level. While the spreadsheet allowed adequate analysis at the departmental level, as departmental plans were rolled up to division, vice presidential, and university levels, it could only be used in a limited manner. To address this problem, the university will be using PC Express to evaluate the data at the aggregated levels later in the process.

Where we go from here

In the spring of 1991, the president will present the final plans to the university's Board of Trustees for adoption. The budgets developed in conjunction with the plans will be adopted by the Board shortly thereafter. These two actions will signify completion of the first cycle of the university's planning process. From that point on, every year prior to the start of a new biennium, the plans and budgets will be revisited and adjusted, ensuring that programmatic and budgetary decisions are consistent with the goals the university has chosen to pursue.

CONCLUSION

Attempting to integrate the various planning and budgeting processes that normally are found on a university campus is a challenging and often, very difficult undertaking. At Eastern Washington University, strong leadership on the part of the university's president and provost and a micro-computer based model have enabled the organization to take a giant step forward toward realizing that goal.

The model placed a fairly sophisticated analytic tool in the hands of the departmental planners with which alternative strategies could be evaluated over a multi-year time frame. More importantly, by identifying and prioritizing budgetary allocations needed to support programs, the model required managers to make the same types of choices and decisions required in the budget process, thereby avoiding the most common pitfall of efforts to link planning and budgeting processes; that of failing to make difficult choices in the planning process, and then being forced to abandon the plans when the budget process requires such decisions.

Turning a Private Label Credit Card into a Multi-Function ID Card

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Bill R. Norwood
Florida State University
Tallahassee
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ABSTRACT

Florida State University has implemented a card system that combines the best features of debit and ID card systems with the versatility of a private label bank card. An advantage of the approach is that all financial processing is done remotely at a bank charge card center. The VisaNet system provides the communications backbone, enabling standard credit card readers to be used, and cash withdrawals from bank ATM's throughout Florida. The system is flexible enough to handle standard debit transactions, enable data to be extracted from self inquiry terminals, support cashless vending transactions, provide an emergency notification system, and serve as a complete University billing system. The system, known as Seminole ACCESS, was pilot tested on over 8,000 students during the Fall 1990 semester. A variety of new and existing technologies have been successfully merged in the development of this system.

Turning a Private Label Credit Card into a Multi-Function ID Card

Thomas G. James & Bill R. Norwood
Florida State University

Introduction

The campus debit card system, in some circles, was the "in" system to install during the last decade. Many forward-thinking institutions, out of a desire to improve the business side of their campus auxiliary units, implemented debit card operations that have been very successful. For a variety of reasons Florida State University (FSU) was not among those institutions that chose to move into the debit card arena in a big way. This is not to say, however, that we have not been trying; for we have been evaluating alternatives to our University photo ID since about 1984 and a Vali-Dine card system has been used for meal plans for several years.

We'd like to say that we were incredibly in touch with the technological trends shaping the debit card industry and that we were waiting for the precise moment to make our move. However, our basic motivation for waiting and studying, and waiting some more, was a lack of money. Although we will admit that after all of the committee work was done, our concept of what a card system should do for financial transaction processing had not been implemented in any existing campus card system that we knew of.

Let's begin by listing some of the issues we felt were not adequately addressed by turn-key campus debit card systems, circa 1987. First, there was a requirement for additional hardware, software, and communication interfaces. Second, our existing administrative terminals, which were operating in a coaxial 3270 SNA environment, could not directly access the debit card system. Third, we anticipated substantial local staff involvement, initially and on a continuing basis, from both the information systems and financial units of the University. And fourth, existing systems were restricted to on-campus use and could not, for example, take advantage of the vast financial networks that exist in our community and state.

No doubt many will feel that these issues are not insurmountable obstacles, and we agree. However, what was evolving on our campus was a much bigger concept for a card system. At the root of our search was the desire to consolidate into a single system all of the financial transactions between a student and the University, as well as those non-financial transactions typical of photo ID usage. If a student chose to, essentially all goods and services on campus could be purchased or accessed with a University-issued card, and the student would receive a single monthly statement of account activity. Thus, FSU wanted a card system that could 1) replace the existing photo ID, 2) be used on or off campus, 3) generate a single consolidated monthly statement, and 4) directly interface into the University's financial systems.

Our search for the ultimate card system led us to examine the benefits of using the services of a bank credit card processing center. As described in our presentation at CUMREC'90, we were able to evaluate the various processes by contracting with a bank card center to provide a billing system for the student long distance service offered by the Office of Telecommunications (OTC).

We were able to assess, for example, the following:

1) establishing accounts for students
2) generating and distributing cards
3) generating monthly bills for multiple merchants
4) collecting funds remotely at the bank card center and posting funds to University accounts
5) establishing on-line terminal access to the bank card center host
6) establishing internal control procedures using bank card center reports and control totals generated when data is prepared and transmitted from the University

Debit Card Pilot Project

When we left Buffalo last May, after presenting our paper to CUMREC'90, we did not know if the idea of implementing a debit card system would be accepted by University administration. We can truthfully say that taking what had been learned in the OTC pilot and turning it into a full-blown debit card system was only a dream of a few people at FSU. We fully expected it would take another year of discussions to move the project ahead, even though the pilot with long distance resale had been successful.

Thus, you can imagine our shock when the concept was supported by the Vice President for Finance and Administration and we were given an opportunity to address our proposal to the University Executive Council. In a matter of days, the President endorsed the idea, appointed a steering committee and a project director, and established a $100,000 line of credit through our Auxiliary Service Board. But that was just the beginning. In a matter of a few more days, the Steering Committee had decided that a debit card pilot project would be developed and in place for the Fall 1990 orientation program, a mere 3 weeks away, and that it would be called the Seminole ACCESS card. Naturally, some of us implored the steering committee to slow down, pointing out that monumental problems could develop if all the details weren't sorted out properly. Our pleading, however, fell on deaf ears; the decision had been made.

The pilot project which we implemented in August involved the following decisions and issues:

<u>Selecting the Target Population</u>

We chose to issue Seminole ACCESS cards to all new students, both freshman and transfer, attending FSU during the Fall 1990 semester, as well as all students who lived in campus residence halls. There were several reasons for selecting these groups. Because all students receiving the card were charged a $5.00 fee, whether they were going to deposit money in their account and use the debit card feature or not, the ACCESS Steering Committee felt that new students might be more receptive to the idea than existing students. All dorm students were included because they had previously been issued a card as part of the long distance resale billing project the prior year, and in order to continue the long distance resale billing system with the new debit card, all such students had to receive a new card.

The total population selected to receive the Seminole ACCESS card was over 8,600 students. Of that total, 2,109 chose to deposit money into their ACCESS account.

Determining Services to Offer

Since the ACCESS card was to become a reality in just a few short weeks, we needed to make quick decisions related to what services should be offered. Because our concept of a universal card implied more than simply a debit card service, we felt compelled to expand the initial offering. Thus, access to the on-campus bank ATM, emergency notification, telecommunications billing services, and a self-inquiry terminal system were made a part of our pilot.

We met individually with all of the offices concerned, and on August 19, 1990, just 12 weeks after project approval, students were depositing funds and using their ACCESS card at over twenty different locations, both on and off campus. Off campus locations were restricted initially to two adjacent bookstores and the gift shop operated by our booster organization.

Developing a Marketing Strategy

Big advertising campaigns and TV spots were high on our list; our wish list that is. Actually, we ended up with a very targeted marketing campaign based on no budget and no lead time. Marketing included: 1) a simple letter to new students and parents just prior to their arrival for summer orientation, 2) group presentations at orientation sessions with parents and students, and 3) buttons and T-shirts worn by orientation leaders and staff at the Seminole ACCESS Center asking "Do You Have ACCESS ???".

The marketing strategy was to explain where the ACCESS card could be used, emphasizing ease of use, the safety inherent in not carrying cash, access to cash in ATMs, a monthly detailed statement of account activity, the emergency notification system, and the personal attention shown at the ACCESS Center. Most students and parents were pleased with the idea of the ACCESS card program and felt that it would be a useful service.

Establishing the ACCESS Center

If one is to have a program like Seminole ACCESS office space is needed, and it is unsettling to be looking for office space that will create a professional image, and be centrally located to the resident student population, knowing that the doors must be open in a matter of weeks! Our problem was partially solved when we located a recently vacated storefront at our University Union complex. Since we were operating on a limited budget, how could we afford to rent office space? What about counters, computers, terminals, telephones? What about staff? Because of the many people anxious to see the ACCESS card succeed, the space, staff, and necessary equipment were made available in time to open the doors for the orientation sessions beginning in June.

Converting Long-Distance Resale System

After participating in the initial pilot of the billing system with the charge card center, our Director of Telecommunications decided to install a new system (BITEK) for long distance resale that provided several enhanced functions. The BITEK system would support, for example, a student deposit, and because it included a computer that communicated directly with the switch, student services could be terminated automatically when charges exceeded the deposit. The new system was a turn-key system, capable of handling all of the long distance billing functions on its own. Our goal was to 1) have BITEK staff modify their system to transfer data to and receive data from our local cashiering system as an interface to the charge card system, and 2) make changes in our

cashiering system to produce files that would be downloaded to BITEK, as well as various supporting reports.

After several false starts, we were successful in developing an interface to provide data on payments and deposits to the BITEK system so that it could activate and deactivate telephone service automatically.

Determining Merchant Agreement and Discount Rates

Naturally, determining who should pay and how much was a hotly debated subject. Discount rates charged to merchants that accept the ACCESS card are adjusted every three months based on the average sales price. The relationship between average sales price and discount rate is inverse. Thus, merchants with small average sales prices are charged higher discount rates than merchants with high average sales prices. Discounts range from 1.5% to 5% for campus merchants. Off campus merchants that accept the ACCESS card will be charged a discount rate 1 percentage point higher than on campus merchants.

A critical pilot project task was the development of a merchant agreement that describes the responsibilities and obligations of the merchant and the University. Credit card industry standard guidelines were followed but the agreement was tailored somewhat for the campus environment.

Developing Local System Interfaces

Our policy regarding the development of local system interfaces is very simple. Any financial transactions that are to be posted to ACCESS card accounts must be generated by one of the following; 1) ZON Jr. type readers operating through VisaNet in support of merchant sales activity, 2) charge transactions created from a batch system such as BITEK which are submitted (uploaded) to the charge card center through their cash letter processing unit, or 3) the University's cashiering system from student deposits or payments.

Our intention was to force all activity through these three control points, eliminating the on-line posting of deposits or payments directly to the charge card center. With financial updating restricted, audit trails would exist in the University cashiering system or the charge center's cash letter system. Because of this approach, our local system interfaces were greatly simplified, and additional application interfaces could be added to the University cashiering system as needed.

Seminole Access System Description

Now that some background and an overview of the pilot project have been presented, let's examine the Seminole ACCESS System more closely.

In-House System Enhancements

Crossover Table - Interfaces for administrative applications residing at our administrative computing center were required. Access to student or financial records using the ACCESS card account number from the ABA coded magnetic stripe were not possible directly since most University records used social security number as a key. Thus, a crossover table was built to allow applications to use either social security number or ACCESS card number to locate records.

Having built the crossover table, access to data from terminals with attached credit card readers was enabled. Self inquiry terminals at various locations throughout campus allow students with ACCESS cards to read and print course and fee information. In the

near future, this service will be expanded to allow students update access to our central address file. Concerns over security have been reduced since data is not accessed by entering social security numbers. One now needs an ACCESS card and a personal identification number (PIN) to use most self inquiry terminals on campus.

Cashiering System - The FSU cashiering system was developed locally in CICS for use with 3270 type terminals operating on host based data files in 1987. This system was enhanced to be the control point for financial transactions related to the ACCESS card. All deposits or payments flow through this system.

This system was modified to create transactions for downloading to the BITEK system in support of long distance resale. Thus, when deposits for the activation of long distance service or payments on the previous months charges are posted into the cashiering system, a separate transaction file is generated. Office of Telecommunications personnel then use a new CICS applications to further prepare this file for downloading. At appropriate intervals the file is transmitted to the BITEK system to update its internal files.

Another local interface involved the addition of a billing address to the University centralized address file. The address file, together with any applications that needed to access this new address were modified.

Charge Card Center Operations

On-Line Access - Once transactions generated in the cashiering system are transmitted to the charge card center, individual accounts can be updated through batch or on-line processing. On-line updates are processed directly at the bank center in Tampa, Florida. Since our cashiering system controls financial transactions, direct on-line account activity is limited to general maintenance functions such as requesting a new card, adding a new account, requesting a PIN number for ATM use, or updating statement addresses.

Reports - Printed reports are produced daily at the bank center and delivered to the First Florida Bank in Tallahassee. A wide range of reports are available, including those used for account activity verification and review, merchant reporting, over-limit and late payment reports, audit trails and cash settlement reports. Microfilm copies of all reports are kept by the charge card center in the event of a lost report.

Lost/Stolen Cards - One of the most important operational issues we faced was how to handle lost or stolen ACCESS Cards. In a normal University environment, lost or stolen picture ID cards are not a serious problem. In our case, the fact that students have money on deposit for use at over twenty-two different locations changed that situation. However, what was expected to be a difficult problem was one of the easiest to solve because the bank already has a system in place to handle such situations.

In the case of a lost or stolen ACCESS card, the student is instructed to call a 1-800 number. This number is active twenty-four hours a day, seven days a week. When reported, the operator will ask for pertinent information, such as when was it lost, and the last time it was used. This information is electronically passed to the charge card center and within a matter of a few minutes, the account is immediately deactivated.

To reduce losses associated with fraud, transactions coming into the system after the card is reported as lost are monitored. When a possible fraudulent transaction enters the system, the bank center calls the card holder to determine if they made the purchase in question. If they indicate they did not, the transaction is considered fraud, noted, and not billed to the customer.

Collections - Collection processing is important for two reasons. First, it is possible for a student to issue the ACCESS Center a bad check and then remove or spend most of

the funds. Second, Telecommunications is actually allowing a student to run up a credit balance for telephone services. Thus, should these situations result in a bad debt, the University has access to the collections system used by the bank. This system will allow collectors (bank employees) to work through prompted screens bringing up accounts that are in various stages of delinquency review calls and send letters automatically.

By consolidating the financial transactions between the University and the student into a single system, we can make much better use of non-payment information. The ACCESS card system makes it much easier to place financial stops on students that owe the University money.

Merchant Authorization - Perhaps one of the most intriguing parts of the system is sales, or authorization, processing. When a purchase is made at the University Bookstore on campus, the ACCESS card is swiped through a credit card reader. The credit card reader then routes the account number, amount of the sale and a merchant identifier to VisaNet. VisaNet determines the card processor, in our case First Florida Bank Charge Card Center in Tampa, and routes the transaction accordingly. The STRATUS computer at the card center reviews the "buy line" of the account and, if sufficient, reduces it by the amount of the purchase. Concurrently, a record is made of the authorization. When this is completed, an authorization code is added to the transaction and routed back to VisaNet, which then routes the transaction with the authorization code back to the University Bookstore.

Should VisaNet fail, transactions will be routed to the National Data Center (NDC) in Atlanta which will route them to Tampa. If STRATUS in Tampa is down, ACCESS transactions cannot be processed. Since we are dealing with a debit card, no credit purchases can be authorized. We are discussing, however, setting default parameters at NDC to allow students to spend up to twenty-five dollars in the event the system is down. This would allow, for example, a student expecting to use the ACCESS card for breakfast to do so when the system was not available. ATMs have separate default parameters and are expected to remain at zero.

Emergency Notification - An additional feature worth mentioning is emergency notification. In the event of an emergency, the bank center, upon notification, will flag the student's account in the STRATUS system. Subsequently, when the student uses the ACCESS card, a "call" message will be routed to the appropriate credit card reader. In our case the student will be instructed to call the FSU Campus Security Office for a message.

Fund movement - To move funds from various accounts, the charge card center uses a system known as the Settlement system. The Settlement system receives detailed transaction (sales) data from NDC daily. Included with the sales information from merchants are cash letters covering how much money is due to be transferred to merchants for their daily sales activity.

In our case, we are allowing the charge card center to move funds directly from various accounts as indicated by the Settlement system. Funds deposited by students are placed in an agency account at a local bank. Funds are then transferred from this account and deposited either to another FSU auxiliary account or to another bank.

ACCESS Card Benefits

We believe the entire campus will benefit by using the Seminole ACCESS card. Students are now able to pay for most campus services with one common card, reducing the need for checks, cash, and credit cards. This also leads to a cashless environment that promotes safety and may reduce thefts. Students also receive a detailed statement showing all of the uses of their card. Parents will be able to relax knowing that the check they sent has been deposited and they can see where their money was used. Funds are available to use sooner than through a normal checking account. Parents know that in the event of a family crisis, the emergency notification system is available to help locate their son or daughter.

Departments can also reap benefits from the ACCESS card. FSU has received numerous audit criticisms for the 80+ cash collection points scattered across the campus. Most of these departments are too small to have the necessary separation of duties required to satisfy an auditor. In some cases, one person handles billing, collecting, and balancing. Thus, departments in which these conditions exist can now meet audit criticisms by using the ACCESS card. All collections from students at the department level can be handled through credit card readers. When cash and checks are not accepted, audit criticisms are eliminated. An additional benefit is that staffing requirements and workload are also reduced. The equipment needed to support departmental collections consists of a standard credit card reader and attached printer.

Academic and auxiliary departments are now able to charge student accounts for services, lab breakage, losses, etc., without collecting cash or completing various forms to be sent to the Cashiers office. The Controller's Office now has fewer cash collection points to worry about and charges are posted to student accounts immediately.

Certainly, one of the hardest problems to deal with at any University is the collection of tuition. At FSU this means hiring approximately 50 temporary workers for a week; moving thirty or more computer terminals to a central location; and having 30,000 students line up over a five day period to pay fees.

Plans are now being developed to allow students to authorize tuition and fee payments from their ACCESS account while using the telephone registration system. If all goes as expected, students will not have to go to a central point to pay fees, which will save the University money and be very convenient for students.

Funding Methodology: Who Pays?

In order to properly consider this topic, one must recognize that campus operations can be categorized into two types: those that generate revenue to pay processing costs, and those that only generate costs. We refer to these as revenue generating and non-revenue generating operations, respectively.

Revenue Operations

Revenue operations are those where goods or services are purchased. These operations include fast food outlets, cable TV and long distance telephone services, bookstore sales, computer store sales, ticket sales, etc. These are the areas where we expect to recover the cost of the ACCESS card system through the use of a "discount rate." If a merchant accepts Mastercard or any other type of bank card as a means of payment, a percentage, or discount rate, of the sales ticket is paid for processing. Funds generated from revenue generating operations should pay for their operational costs, but they should not pay excessive discount rates in order to subsidize non-revenue operations.

Non-Revenue Operations

If the costs associated with non-revenue operations are not recognized and accommodated, then funding the ACCESS card becomes difficult. By non-revenue, we mean any operation that uses the ACCESS card for other than financial processing purposes such as taking class attendance, authorizing admittance to University functions or participation in intramural athletic programs, or determining the current status of a student. These operations generate costs, and since every student, faculty, and staff member will eventually be required to have an ACCESS card, non-revenue uses of the card will increase. Thus, base funding requirements for the ACCESS card must cover the added costs of the non-revenue generating operations.

At the present time, we are using the $100,000 auxiliary credit line to fund ACCESS card costs related to non-revenue operations. However, many of the processing functions of non-revenue operations can be done without incurring additional transaction processing costs at the bank card center. For example, data can be downloaded from the bank card center to personal computers for use in access or student verification applications such as athletic ticket sales or class attendance checking. While there are opportunities to avoid costs in handling non-revenue operations, there are costs associated with these functions the University must be willing to accept.

Discount Rates

Since Florida State University is the "issuer" of the ACCESS card the University determined the discount rate, as well as where the ACCESS card may be used. During this analysis, it was determined that the discount rate table had to be a sliding scale based on the average ticket sold by a merchant. The rate was based strictly on the per transaction cost associated with processing sales transactions from merchants. A merchant can expect to pay a discount rate of as little as 2% or as high as 6% on ACCESS card transactions.

Conclusion

The ACCESS card pilot at Florida State University which was based on the concept of a private label bank card was successful. We have attempted to maximize use of the card on campus, and we have made available the state-wide network of MAX ATMs. Students may withdraw cash at any of 250+ locations using their ACCESS card and PIN number. This is a critical factor in the success of the operation. Without access to cash, a student would not be as likely to leave funds on deposit in their ACCESS account.

Initial projections indicated deposits would total approximately $250,000 after the first three months of the project. Actual deposits totaled over $1,100,000 for this period, with merchants receiving over $530,000 dollars in sales. Thus, deposits were almost 400% greater than expected. Students have utilized the MAX ATM network for cash withdrawals amounting to $250,000, and the ACCESS account currently has a deposit balance of over $220,000.

Due to the increased level of deposits, we have also generated more income from sales. This has amounted to approximately $11,000, with $10,000 coming from the merchant discount rates. ATM withdrawals generated approximately $1,000 dollars in revenue.

At Florida State University, our campus card system solution is based on the merger of several technologies. The tools available in the private financial sector are powerful,

reasonable in cost, and waiting to be used. We are now in the process of merging the following technologies to further support and enhance our card system:

First Florida Bank Center will provide the backbone of the financial network for debit, ATM, hardware, software, and merchant support.

DATACARD Corporation will provide the technology for the new digitized photograph for the ACCESS card. This will include on-site card creation and encoding of the ABA encoded magnetic stripe, as well as storage of the digitized photo for future use in a variety of innovative applications.

DEBITEK Corporation brings the "cashless transaction" environment to the ACCESS card for all vending operations. This is a key part of the FSU solution because it allows us to avoid the transaction cost of the banking system for handling small ticket operations for which a discount rate would be prohibitive. Even more importantly, it gives us a vehicle that can also be used in off-campus privately operated businesses such as local copy services immediately adjacent to the campus.

TELZON Corporation enables hand-held magnetic stripe readers to be used to check attendance in large lecture classes, or check participants in intramural activities to determine if they are currently enrolled.

BITEK Corporation is usually a self-contained monitoring, billing, collection, and accounting system for various services such as long distance resale, cable TV, etc. Because of the single bill concept, interfaces to our cashiering system have been written allowing full integration of the two systems. Financial functions are handled outside of the BITEK system, but the BITEK system feeds charges to ACCESS, and is in turn fed information to automate the activation and deactivation of services.

Our goal is to apply these technologies, and the concepts behind them, to develop a universal card system. At Florida State University the Seminole ACCESS card truly integrates financial processing, and redefines the meaning of access to University services.

Keys to Success for Senior Level Computer Managers

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Attributes for good executives are outlined in detail. The vision you must have to change the organization must be a high priority of your job. The professional credentials that are required to do your job and how you are able to establish your professionalism in a higher education setting are discussed. The management ability you must have including, people skills, types of supervision, and the relationship to power both personal and organizational are reviewed. The executives role in establishing a good management team are considered. Finally, attention is given to critical components of managing and controlling change within the organization.

Introduction

In this review of the characteristics, skills, and attributes required of the computer and information managers in higher education, the starting point is to examine the credentials of these professionals as well as the historical development of the position in higher education.

Origins

Not unlike the emergence of librarians, bursars, and registrars from the ranks of the faculty in the colonial colleges of America, faculty were the first managers of computing resources on college and university campuses. Indeed, the early computer scientists and mathematicians were pressed into service on a part-time basis to assist with the basic data processing that the business office required to conduct the transactions of the institution. However, as the complexity of the data processing increased the position became permanent. Soon the need to provide services in support of research and instruction became part of the service requirement. This expansion was often met by creating separate academic computing centers. Today we have instances of campuses with combined centers as well as those with separate facilities. Reporting lines are equally complex with the majority of facilities still reporting to a finance or administrative officer. Indeed this early association with administrative functions rather than academic endeavors may have been the main reason that the computer or IS manager rarely enjoys faculty status like his colleague in the library. This comparison with library director will be revisited later since there is similarity in the provision of academic services provided by these professionals. Turning from the past to the present, who is performing the task of computer and IS management on our campuses? What type of academic credentials are needed? How important is professional certification?

Charles H. Warlick of the University of Texas provides the most comprehensive body of information about the IS manager in higher education through his editing of the annual Directory of Computing Facilities in Higher Education and the companion Salary Survey - Academic Computer Facility Directors. In the 1990 edition, Warlick profiles the average computing facilities director as being forty seven years old, with six years of service as director, and having earned their last degree fifteen years ago. The types of degrees are varied with just less than half of the highest degrees earned by directors being in computer science, mathematics and the physical sciences. Business degrees were numerous but still less than the combination of other types of degrees earned. This diversity of academic background may be viewed as a positive or negative factor in evaluating the credentials of the IS professional. Can "anyone" become a computer center director and if so is that a good thing?

Perhaps it would be useful to return to the comparison of IS professionals and their colleagues in the library. A library director is usually expected to have very specific academic credentials. A masters degree in library science (MLS) from a school accredited by the American Library Association is usually a prerequisite for employment. Does the lack of similar academic credential disadvantage the IS professional or does the diversity of educational background provide higher education with a better prepared pool of professionals to manage IS facilities? This question may be tested as the convergence of computing and library services continues as information services are reshaped on campuses.

Professional accreditation may be one way of off setting the lack of specific academic credentials. However, a closer look would suggest otherwise. Certainly there are professional societies that serve the IS professional. The Association of Computing Machinery (ACM), and the Computer Society of the Institute of Electrical Engineers (IEEE-CS) are primary among IS professionals in higher education. The Data Processing Managers Association (DPMA) also has impact but still seems to be dominated by members from the private sector. These organizations invite membership without specific qualifications and are complimented by other voluntary organizations like CAUSE.

However, there is an accreditation program which is administered by the Institute for Certification of Computer Professions (ICCP) which has been formed by eleven professional societies including the three previously cited. This certification process is done by a combination of testing, job experience and/or academic training. The three designations offered are: Certified Data Processor (CDP); Certified Systems Professional (CSP); and the Certified Computer Programmer (CCP). Despite this established method of certification and recertification, it would not appear that much attention is given to such certification in the recruitment of IS professionals in higher education. At least, it would not appear so by the review of position announcements.

This paper offers no specific position on the question of certification but simply reviews the current situation to show what professional credentials the IS manager can point to and how they compare with their academic colleagues.

Academic Colleagues

The continually developing maturation process of information technology on our campuses has not provided a shortage of those who are willing to play a part in providing services or formulating related policies. Certainly, IS managers cannot assume that information technology is solely their domain. Others are playing a part and will continue to vie for resources and responsibilities.

Faculty, particularly those in the computational and quantitative sciences have long been an alternate source of expertise to support or contest the level of services and expertise offered by the IS manager. It would not be far fetched to suggest that many campuses may have found their Computer Science department and computer center to be out of synch from time to time. As stated earlier many IS professionals may have come from the faculty. However, many would attest that the perception of them by former faculty colleagues can change. This situation has been expanded to include faculty from many different disciplines who were quick to adopt the personal computer as a teaching or research tool and have not only mastered it but may be able to develop a greater body of computing expertise within the narrow focus of their discipline.

Library directors have begun to emerge as strong competitors for resources and responsibilities in the provision of information services. It should also be noted that equipped with strong academic credentials, frequently accompanied by faculty status, they may be formidable allies or powerful rivals. The convergence of computing and library services through electronic information exchange will provide a sharp focus on the relationship between the Library director and the IS manager.

In addition to these more traditional academic colleagues, the latter part of the 1980's has seen the emergence, or at least the partial emergence, of the Chief Information Officer (CIO) even if many carry out the coordinating of information and technology related services and policies under a different title. A CAUSE professional paper recently provided a comprehensive review of this phenomenon. The Chief Information Officer in Higher Education; Penrod, Dolence, and Douglas; CAUSE Professional Paper Series, #4.

Finally, we should not overlook the student body. Their perception of the IS manager has traditionally been one of a service provider, a gate keeper, a part of the administration. The more technologically advanced student may have more elaborate expectations and provide new challenges for those charged with managing, securing, and maintaining information and computing services. While it may be unnecessarily paranoid to think of a campus, nation, or world full of hackers with the primary objective of illicitly accessing data or computing resources you have been charged with protecting. It is quite clear that networking and related security measures are more critical now than ever before.

So what does this mean to the IS professional. First and foremost it means that it is more important than ever to act in a professional manner and to be sure to remember that there will be a need to accentuate all aspects of professionalism among their management team and staff, if they are to continue to play a leading role in the provision of services and the establishment of appropriate policies and procedures. In other words it may not

continue to be business as usual or things that were held to be self evident in the past, may be under new examination. The remainder of this paper deals with how the IS professional can best use professional tools to deal with the challenges of today.

Vision

In today's environment, Information System Managers must be seeking new ways to do business. "If it runs, don't change it," isn't good enough anymore. The manager that does not create the environment for change may be a liability to the organization.

Today's Information Systems (IS) Manager must keep up with the trends in today's technology. He must know the way his institution conducts their business and have the vision on how to transform the way they do business. A good manager must also find new ways to turn out effective managerial information systems.

If the IS Manager does not have vision, then someone else in the organization may have this, or he can visit other institutions to gain this critical information. Today's top Information System Manager must become directly involved in the planning and implementation strategy for strategic systems. Keeping up with technology is critical to the success of information systems.

Choosing what is Important

Picking a strategic system is the most important function we can play. A university has many goals and objectives, and the systems we implement are a means to an end, namely to achieve these goals. Picking the right system is sometimes known as a critical success factor. Hence, the projects we select are essential in the support of achieving these goals. The system we choose must be visible from the top yet support the operational functions that run an institution. If the system we pick is not visible from the top, then we may have a hard time explaining what we accomplished for the year.

A good example of a strategic system or subsystem might be automating student refunds, thus producing faster turnaround for student refunds or telephone registration, thus reducing long lines for registration. Both are very visible from top and bottom.

Do we slice off a piece or phase in the project? Many projects go down the drain due to two or three year target dates with nothing visible to the user; hence, a loss of confidence in the computing organization. It is always best to design from the top down and build from the bottom up whenever possible. Thus, picking a piece or a phase when the user can visibly see some tangible output is important.

Once we pick a project and get the go ahead, then matching

the right resources to the job is essential. This requires an understanding by management of picking the right people to get the job done. Do we place three "drivers" on the project, who will fight each other for control, or three "amiables", who must be stroked each day before they can work. Do we control the "enthusiast", who starts everything but finishes nothing? Matching the right resources to do the project is a skill we rarely give much thought, yet it is a critical factor to the successful completion of the project.

Do we get the job done or study the project forever? You can study the project for six months and program for six months for 95 percent of the goal or you can study the project for three months and program for six months to support 90 percent of the goal. Defining the project may never end. One must make a reasonable decision to proceed after lengthy discussions with the user in defining the system.

Cross Organizational Issues

When we get to the roadblocks, do we address the cross organizational issue or hope our subordinates can hit their heads against the wall until it cracks. It is the Information Systems Manager who is responsible for compromise and solutions.

Do we stand up for our staff, fight for our beliefs or back down and let others make our decisions. It is up to us to sell ourselves and our ideas. This comes about through doing what we say we are going to do and meeting our deadlines and obligations.

Acting as a Change Agent

A crumpled piece of paper with letters clipped from newspapers and magazines spelled out the following message in a prominent advertisement:

We have the information, and getting it back will cost you!

We may laugh at this portrayal of the world of computing, and yet, are we still perceived this way by the people we are trying to serve? If we are not good change agents, the answer to this question may be "Yes" in all too many cases.

Are we good change agents? If we look at current articles and our speeches and casual conversation we seem fairly convinced that we are not good change agents. We are the ones who know the technology, who struggle to keep up with it and who continue to try to educate other people. However, we are also the ones who continue to discuss how the people we try to change keep resisting. They don't want to change. Perhaps the problem still sits with us.

Good change agents must focus on the needs of their institutions. Yet, where is our focus? We have services to

maintain and build and more than likely we are still highly focused on the technology itself, not on the problems of our colleges and universities. We can test ourselves by looking at what we read, who we talk with, and what we talk about.

- Are we limited to Computerworld, Datamation, Supercomputing, MacUser and the computing section of the Chronicle of Higher Education?
- Are we spending most of our time with other technology oriented people?
- Are our conversations about upgrades, capacity problems, project development deadlines, and the merits of one computer manufacturer versus another?

If so, how well do we understand the people we are trying to serve? How can we have a balanced overview of their needs and those of the institution itself? How can we say we have the right answers when its possible we are not even addressing the right problems? Is it any wonder that we find it difficult to make the changes we feel are necessary and to get the funding to make those changes?

Good change agents must be willing to change themselves. In this regard, we, as computing professionals, are as resistant to change as anyone else. Cutting someone else's budget to fund out technology is okay, but cutting the central computing budget (assuming you are in central computing or networking) to fund departmental machines or local area networks is a different story. If we have a negative reaction, it is based upon knowledge of the institutional problems and proper application of technology or is it based upon loss of control, downsizing of our importance, or other personal feelings?

Good change agents must know themselves. We cannot start to change ourselves or our institutions until we are willing to really look at ourselves and know who we are and what we really have to offer. Most of us don't really know ourselves. We have developed some wonderful defenses that allow us to be comfortable enough and confident enough to function. Very few of us will drop all of our walls, but if we are still learning about ourselves, we are on the right track.

Good change agents listen. One of the ways we learn about ourselves, the problems of our institutions, and the problems of the people we are trying to serve is to listen. Much has been written about good listening skills and much of it is sound advice. It boils down to one thing: We cannot learn while we are the ones doing all of the talking, about ourselves and about our technologies.

Good change agents market themselves. On one hand, we cannot do all of the talking. On the other hand, we cannot afford to be

silent, either. In tandem with listening to problems and knowing our worth in solving those problems, we must communicate that worth to our institutions. Information technologies may indeed be the keys to solving several of the major pressing issues for education. However, if we are not getting the messages out and being heard by the right people, those may not be seen and put to use.

Marketing is not just selling; it involves all of the attributes mentioned above. Marketing involves listening to the needs of the people we serve, understanding those needs, knowing what resources and skills we have to apply to meet those needs, changing our combined resources an skills if required, and then coming to an understanding or contract with our "clients" to deliver the necessary services.

Good change agents are leaders. A leader is proactive, not just reactive. As change agents we cannot afford to sit back and wait for problems to come to us. Enough of them do on their own, and we end up spending time solving them. But perhaps many of these problems are better left unsolved. A good change agent works to get an overview of what the right problems are and works to solve them. This is not easy because all problems cry for resolution.

Good change agents accept responsibility wisely. Problems related to computing, even large administrative systems, do not necessarily belong to computing centers. We do not have unlimited resources, therefore it is understandable to think that we can solve all problems. More importantly, computing centers should not own administrative systems. The users who are served by the systems are the rightful owners and must accept the responsibilities that come with it. The responsibility for choosing which problems to solve must sit with the college or university as a whole. Upper level computing managers who accept the wrong responsibilities without adequate resources are destined for trouble. Sometimes we can best lead by helping others accept responsibility.

Ability to Manage

The functions we are hired to do are no more than what we learned in Management 101; that is, we plan, organize, control and supervise.

The skills we need to do the job are still the same; namely, people, technical and administrative. Most of us are promoted with one or maybe two of these skills. What about our people skills? What type of a manager are you? In the decision process of planning, are you a participative manager or do you use benevolent participation? Do you listen but make the decisions no matter what your subordinates say? Do you make decisions, and are they timely? What style of leadership do you use? Do you use all four styles

available; namely, do you tell people what to do, sell your subordinates on what and how they should do it, ask how they would do it, or just tell them to go do it.

Each one of these styles is important in getting the job done, and each style depends on the maturity level of the subordinate. As managers we must deliver on what we say we will do, if our users are to have confidence and respect for our ability to get the job done.

Executive Ability

The ability to work with others in the organization at your level and above is vital to the success of the Information Systems Manager. Do you make periodic visits to the Deans, Department Heads and Vice Presidents? Do you know your peers? Remember we make most of our decisions in an informal setting.

The ability to sell our plans and decisions is so dependent on our abilities to influence those above us.

Good executives admit their mistakes to their subordinates and are not afraid to correct their errors.

The ability to broaden your horizons and gain the ability to be a good executive can be helped by actively participating in a professional organization.

Conclusion

Good IS Managers make change the rule rather than the exception and spend 40 percent of their time on creativity and looking at the way the institution does its business. They hire good managers and keep the organization lean and flat. It is to their advantage not to keep employees in the organization that cannot produce. No one can afford it.

IS departments that survive the 90's are managed well. Where and to whom a department reports is minor compared to how they are managed. The reporting line of a department has very little to do with the department functions. Good managers make things happen.

Levelling the Playing Field;

Ways to Set Priorities Among Competing Projects

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Abstract

In university administrative computing environments, the number of "urgent and essential" projects often far exceeds what the computer staff can design, program, and implement in a timely fashion. The problem is particularly acute when the backlog of such projects has grown significantly due to delays from an extended period of hardware conversion. Following a history of uneven and ad hoc approaches to allocating computing resources, a medium-size independent university is developing a more systematic, open, and fair method of evaluating, selecting, and setting priorities among such competing projects. This paper defines the problem, discuss the inadequacy of past approaches, and outline new methods which are being developed.

Introduction

An ongoing challenge in most university administrative computing environments is that of balancing a seemingly unlimited demand for programming and system development with limited staffs of programmers and analysts. In the eyes of deans, directors, and other administrators relying upon computing to carry out their duties, their own particular projects are usually seen as "urgent and essential" needs which must--in the interest of the institution--move to the front of the queue and be addressed immediately.

Beyond the issue of which projects come first, the sheer number of projects in the queue also can be a cause for concern. Even if there is agreement on the order in which projects should be addressed, requested work can so far exceed the programming capacity that the end of the queue would move many years into the future if nothing were done to limit the number of projects. Consequently, there is a need to determine which projects will be done at all as well as to establish a priority order among accepted projects.

There are basically two approaches which can be used to control the volume and priority of computing requests. One is through a system of billing or "chargebacks." Charging for services imposes a form of marketplace control over computer utilization and the allocation of computing resources. If users are billed, only those who can afford the cost of programming or system development can get their projects in the queue; those with the largest budgets will typically be the first in line with the largest projects. Under such a system, however, there may be little relationship between whether a project is "affordable" and its actual importance in terms of broader institutional needs.

The second means of setting computing priorities is through a centralized process in which each proposed project is reviewed in light of computing resources and institutional goals as well as its importance relative to competing projects. Such decisions are sometimes placed solely in the hands of the administrator in charge of computing, but more often a committee is involved. The committee approach has two major advantages: (a) it provides broader input of both information and perspective into the decision process, and (b) it provides a greater degree of legitimacy for the process and thereby should lead to wider acceptance of the decisions.

This paper focuses on these two approaches to resource allocation in administrative computing. After a brief review of some of the recent literature on the subject, it will describe the problems in computing resource allocation experienced by one medium-size independent university and outline changes currently underway to address those problems.

Patterns in Setting Priorities

As many authors have noted, each institution's particular organizational structure for information technology should reflect the campus culture and traditions as well as the strategy it has chosen to achieve its goals (Barone 1987; Blackmun, Hunter, and Parker 1988; Dillman and Hicks 1990). Consequently, it often is futile to simply try to impose one institution's structure on another. Many of the same forces are acting upon different institutions, however, and each can learn from the experience of others. With no pretense of being exhaustive, the following paragraphs will illustrate the major themes under discussion by examining trends, weighing arguments, and looking at the experience of others in grappling with these issues.

Approaches to Computer Billing

Institutions of higher education fund campus computing in a variety of ways. At one end is the "library" model in which all computer costs are budgeted centrally and there are no chargebacks to users. At the other extreme is the "economic" model designed for full recovery of costs from the users. Between are a number of variations involving some central funding combined with a partial recovery of costs through billing users.

Discussions of billing for computing services often focus upon the issue as a problem of funding the cost of computing (Alley, Shaub and Willits 1987; Robinson 1988). As the same amount of institutional money usually is involved whether it goes directly to the computing budget or gets there by way of the departmental budgets of users, however, the issue really is one of allocation of resources. It is computer billing as a means of allocating computing resources and determining priorities among competing projects that is of interest in this paper.

Billing for use of computing resources has always been more common in administrative computing than in academic computing. The larger the institution, the more likely also it is to follow the chargeback approach. Billing was quite common in the 1970s, and a 1980 CAUSE survey found that between 1976 and 1980 there had been an increase in the percentage of institutions which were charging users for computer services (Thomas 1981).

In the 1980s, however, there has been a trend away from billing for administrative computer services. A 1984 survey of small institutions found that the prevailing pattern was not to charge users for computer resources, either on a real dollar or a cost accounting basis (Coughlin 1986). In the 1985 CAUSE survey of member institutions, only about 40% indicated that they billed for administrative computing costs, down from 60% in the 1980 survey (Thomas and van Hoesen 1986). Larger institutions were still more likely to charge, but even among large institutions the percentage not charging doubled to 33% over the five-year period whereas among medium-size independent institutions the percentage not charging went from 38% to 75%. Results from the 1990 CAUSE survey are not yet available, but there seems to be no indication of a reversal of this trend away from billing.

Advocates of the chargeback model as well as institutions which follow that approach usually are sensitive to adjustments which are needed to make it work. In arguing the merits of billing for computer resources, for example, Chachra and Heterick (1982) emphasize that if this approach is to be successful the charges must be realistic, equitable, and predictable. In describing an institution which made a recent decision to move from central funding to 100% cost recovery in the area of administrative system development, Bushnell and Heller (1989) note that the change was made in phases and was accompanied by the transfer of funds to the budgets of user departments based upon historical patterns of usage.

Some institutions have attempted to address the issue of chargebacks and priorities from a middle ground position. This involves establishing a basic level of computing service which is centrally funded and provided to the entire campus community with no individual department or program charges. Computer usage above this base level is considered to be incremental and discretionary and the individuals or departments are charged for such services. In describing this approach, Orcutt (1986) notes that in addition to providing an equitable means of controlling the level of usage, this approach stimulates a comprehensive and strategic approach to the use of computing and helps create an awareness of what a university expects from computing and what limits it might wish to enforce.

But as noted above, more and more institutions are choosing not to charge at all for programming or for computer usage. In describing one institution's recent decision to forego the chargeback approach, Bent and Enright (1990) point out that charging campus users would not generate any more money in support of computing while it would reduce the flexibility of the administration in assigning resources to the most important projects. In addition to the findings of the five-year surveys, the popularity of central funding for administrative computing can also be seen in many of the "Campus Computing Environment" features in CAUSE/EFFECT in recent years (Grinnell College 1988; Hamilton College 1989; McMaster University 1988).

Guiding Computing by Committee

Democracy has come to computer decision-making on most campuses. As computers have become increasingly important to both academic and administrative activities throughout the campus and as microcomputers have served to both decentralize and demystify computing, more and more constituencies both need to be involved and insist on being involved in computer-related decisions.

This growing involvement of users has coincided with a trend toward consolidation of control over computing and other information technology at higher administrative levels (Plourde 1986). Although at first glance these may seem to be contradictory trends, they can in fact be quite complementary if they evolve in a coordinated way. In analyzing the potential as well as the pitfalls of setting up a "computer czar" on campus, Fleit (1986) outlines several preconditions which should be present in the institution if such a position is to be effective. One of these is that the institution have in place a sufficient number of well-functioning computer advisory groups, "staffed by people who know what's best for themselves as users and who can take a broad look at what's best for the institution. In other words, the school should not look to concentrate power in the hands of a single individual" (p. 30).

There is one dilemma which confronts institutions as they establish committees for planning and setting priorities in administrative computing. This derives from the fact that the users who are generally closest to the computing needs and therefore are often in the best position to provide the most valuable "input" typically are mid-level or lower in the institution's administrative structure. They have the insight as to what is needed, but lack the power to bring it about. On the other hand, those at the presidential and vice presidential levels have the power but may be quite removed from the day-to-day aspects of computing on campus. In recognition of this situation, institutions often have set up two-tiered committee structures.

There are many examples of this type of two-tiered committee structure (Barone 1987; McMaster University 1988; Wenger, Gualtieri, and Leninger 1987). The specific committee structures, membership, and responsibilities differ from one institution to the next, but some quite common themes run through most examples of this approach. The lower-tier committee typically is composed of administrators such as the registrar, directors of admissions and financial aid, controller, purchasing director, and other middle level administrators whose operations are heavily dependent upon the administrative computing systems. This committee is often quite large and broadly representative. In addition to facilitating the two-way flow of communication between the users and the computer staff, committees of this type frequently are asked to review requests for programming and system development as well as to help with long-range planning in the area of computing.

Recommendations from this committee typically are then passed up to the vice presidential level. Whether as a formal computer planning and policy committee or as part of the tasks of a more general president's cabinet, decisions regarding the allocation of computing resources as well as the final voice in planning and major hardware acquisitions will generally come from this level. In some instances, the president also becomes involved at this stage.

Indicative of the growing importance placed upon an effective committee structure in university computing is its centrality in a set of guidelines developed recently by CAUSE and EDUCOM. Designed to help institutions in evaluating their information technology resources--both self-initiated evaluations and those in response to accrediting agencies--the guidelines expect that "appropriate structures, such as user and policy committees, exist to provide guidance for the planning of the institution's information technology resources and services" (Evaluation Guidelines 1988).

One Institution's Experience

With that brief review as background, the remainder of this paper will examine the past experience and current plans of one medium-size independent university in dealing with these issues. The university's main campus, which is the focus of this paper, has an enrollment of 3,800 students and offers programs in the arts and sciences and in a number of professional areas. Degrees are awarded at the baccalaureate, first professional, masters, and doctoral levels.

Administrative computing until recently was under the control of the financial vice president. The management and staff of the computer center tried to take a universitywide perspective and were generally responsive to the needs of other administrative users on campus. It was always clear, however, that administrative computing was run by the financial side of the university, that decisions regarding direction of administrative computing were made there, and that projects from that sector usually received highest priority. This advantage was compounded by differential billing practices and the absence of an organized users group.

In 1985, the university began a period of hardware conversion in administrative computing which ended up lasting more than four years. As the initial conversion dragged on and on, delayed in part by unforeseen problems of package implementation and in part by what seemed to be an unending escalation in hardware needs and costs, the campus grew increasingly frustrated with the whole area of administrative computing. In early 1989, a new president decided to move administrative computing over to the academic vice president, who for more than a decade had overseen academic computing on campus. The academic vice president and the director of computer services were asked to assess the problems in administrative computing and to make a recommendation on how to proceed. After several months of consulting intensively both with major users and with vendors of hardware and software, they recommended that the university abort the conversion underway since 1985 and instead make a speedier and less costly conversion to another brand. The president accepted the recommendation and this second conversion was completed in nine months.

Most administrative departments at the university rely on locally designed and written software for their mainframe applications. By the time the second conversion was completed in the Spring of 1990 and it was possible to begin focusing on system development and major programming enhancements, there was a huge backlog of computing needs which had accumulated during the development moratorium of the previous four years. This made even more pressing the

need to work out an efficient, effective, and equitable procedure for approving projects and setting priorities among approved projects.

Some Pay, Some Don't

The university has always followed an "economic" model in administrative computing, an approach which has come under increasing internal criticism in recent years. Although it never attempted to recover costs fully, the university followed a practice of billing the administrative units for both programming and running costs. Academic computing at the university, in contrast, has been operated totally on a "library" model since the mid-1970s.

Administrative computer billing has been in terms of "real money" in the sense that in the budgets of operating units there was no distinction between funds which could be spent on computing and those which could be spent on equipment, travel, etc. Moreover, with a few exceptions budgets were not adjusted to accommodate increased computing costs. The economic model in administrative computing thus has meant that those administrators and departments with the larger budgets had greater access to computing resources, whether or not their computer projects were most important from the perspective of university priorities and goals. It also has meant that regardless of size of budget, departments often faced unpredictable increases in non-discretionary computing costs without any corresponding increase in their budgets. For example, charges for essentially the same level of computing rose from under 50% to almost 70% of the non-salary budget of one department over a three-year period.

Beyond the problems inherent in such an approach, administrative computing at this particular university has had an uneven and inequitable cost recovery structure under which several major areas were able to play by different rules due to purely historical reasons. While most users must pay for all services, one major office is charged for running costs but not for programming, and another entire sector is not charged at all.

As a result of the origin of administrative computing as a branch of the business office in the 1960s and its continued control by that sector until the late 1980s, the finance center has never been subject to charges either for programming or for running costs. This tradition of free computing for the finance area combined with the fact that until recently the computer center reported to the financial vice president gave that sector an obvious advantage over other users. Even with the growth of computer use in other administrative areas, the financial area still represents about half of the usage while accounting for very little of the cost recoveries. The unevenness of the "playing field" was particularly evident several years ago when an expensive new application software package acquired by the finance center was charged to the computing center's budget. It would have been very difficult for any other user area to deflect software acquisition costs in a similar way. Although the advantage of reporting lines was eliminated in 1989 with the change in reporting structure, the billing structure has not yet been changed due to budget adjustments which are needed first and because of emerging plans to eliminate user billing entirely.

Since the early 1970s when the student record system was first computerized, the registrar's office had been assigned a full-time programmer who was budgeted in the computer center. Although perhaps originally intended as a temporary and transitional measure, this pattern has continued until the present day. Some years ago the arrangement took the form of a programmer either physically located in the registrar's office or housed in the computer center but working exclusively on registrar systems. For the past decade, however, it has taken the form of the computer center keeping track of programming time required by registrar projects and charging

this against a "credit" of one FTE programmer. As the registrar's needs in recent years have generally required less than one FTE programmer, the difference in the credit has at times been assigned to projects for admissions, financial aid, and other areas of academic administration. For the registrar's office, however, the effect of this historical arrangement has been that it gets is programming free but still must pay for all computer running costs.

Other than the finance center, the registrar's office, and the occasional case of the registrar's office programming credit being assigned elsewhere, all other administrative computer users must pay for all programming as well as running costs. This has resulted in one of three situations as far as those other users are concerned: (a) some users are unable to proceed with needed projects because their budgets do not allow the cost, (b) some users manage to get their budgets increased to cover the needed expenditures, although there has been no standard procedure for such requests, and (c) some users simply find they are overrunning their budgets due to unpredictable computing charges and end the year with a deficit.

Experience With Computer Committees

As with billing, academic and administrative computing at the university have followed quite different paths in the use of committees. For a few years in the 1970s there was a University Computer Committee whose membership included both faculty and administrators and which nominally had broad jurisdiction over all campus computing. In fact, however, that committee's focus and effective jurisdiction were limited to academic uses of the university mainframe computer, which at that time was essentially an administrative computer which also allowed a certain amount of academic use.

In the early 1980s, that ineffective universitywide committee was replaced by an Academic Computer Committee. The new committee, composed only of faculty and students and focusing only on academic computing, has proven to be much more effective than its predecessor. The committee has provided an ongoing forum in which to discuss academic computing issues as well as a means to facilitate a two-way flow of communication between the providers of computing and the users. Moreover, the Academic Computer Committee in the mid-1980s formed the basis for a successful planning process for replacement of the academic mainframe (a separate academic computer had been acquired in the early 1980s) and has guided the growth in academic computing over the last five years.

In contrast to the situation for the past decade on the academic side, to date there has been no effective forum in which administrative computer users could discuss projects and priorities, much less have any formal influence upon the general direction of administrative computing at the university. This contrast between academic and administrative computing in terms of user involvement in decision-making became strikingly obvious in the mid-1980s as planning got underway for replacement of both the administrative and academic mainframes. As has been discussed in some detail elsewhere (Fennell 1990), the difference in user involvement led to significantly different outcomes of the planning processes.

The outside consultants who were hired to prepare the 1985 hardware conversion plan for administrative computing also noted the lack of a structure for involvement of users in administrative computing at the university. They pointed out that university computing policies usually are developed by a committee made up of management level personnel with a direct interest or concern for the effective utilization of computer resources. Concerned about this lack of a sense of direction in administrative computing due to the lack of a formal computing policy, the

consultants' report urged the university to develop and adopt a formal computing policy addressing areas such as organization, scope of services, personnel, planning, setting priorities, budgeting, and management. A mechanism for setting priorities was noted as a matter of particular importance.

The university followed the consultants' 1985 recommendations on hardware and software, a decision which lead to a long, costly, and ultimately aborted conversion. No action was taken on the consultants' recommendations regarding a long-range plan or establishment of a users committee, however. Consequently, influence on computing direction by anyone other than those in the direct chain of administrative reporting has continued to be minimal, informal, and sporadic.

Steps Toward a Better Way

Following completion of the second administrative mainframe conversion in the Spring of 1990, the university this Fall is initiating several major changes in administrative computing. One change is in reporting structure. After decades of being under the financial vice president and a year and a half of reporting to the academic vice president, administrative computing is now being placed under the university's newly established executive vice president. This new reporting structure should prove to have two distinct advantages. By separating the reporting lines from any of the major user areas--either academic or financial--the change places control of administrative computing in "neutral territory." Moreover, being more directly under the president's office should help strengthen administrative computing in terms of visibility, planning, and funding.

As soon as administrative computing began reporting to the academic vice president in 1989, the decision was made to work toward the elimination of computer charges to administrative departments once the hardware conversion was completed. As noted above, billing for computer use was eliminated more than a decade ago in the area of academic computing, where funding is provided centrally and where students and faculty have unlimited free access to computing facilities for classroom related work and for research not supported by outside grant funds. Given that the system of charging administrative departments for computer work and the corollary expectation that the computer center will generate a certain dollar amount of recoveries to help offset its budget is merely moving money from one university "pocket" to another, it will be both more efficient more equitable to adopt the model which has worked well in the academic area.

Two factors make the elimination of billing for administrative computing more complicated than was the equivalent decision in academic computing, however. Whereas budget recoveries from academic use of the computer were quite insignificant at the time the decision was made in the 1970s to eliminate such charges, administrative computing recoveries currently account for between $400,000 and $500,000 on the "revenue" side of the university's annual budget. To adjust for this revenue "loss" which will accompany a move away from billing, the budgets of a number of user departments will need to be adjusted downward by the amount they would otherwise be paying in computer charges. Determining the appropriate amount for such adjustments will be difficult, particularly given the erratic pattern of charges in recent years as result of hardware and software conversions.

The other major difference is that unlike academic computing, the area of administrative computing involves significant amounts of system design and applications programming by the staff of the computer center. Inefficient, uneven, and inequitable as it may have been, the system of charging administrative departments for that work has served to limit the flow of such requests. With free access under the anticipated change, procedures must be put in place for evaluating proposals and for setting priorities among proposals which are found to have merit and importance.

The university intends to address this latter issue through establishment of a two-tier committee structure. Although the details of membership have not yet been worked out, the basic structure will be that of a broadly representative administrative users group at the lower level and an upper-level planning and policy committee composed of the vice presidents and chaired by the executive vice president. The director of information technology will work closely with both groups.

Under this plan, anyone requesting system design or programming work beyond routine maintenance or minor upgrades will be required to present the proposal to the user committee for review. The committee will review the proposal carefully, examining its intrinsic merits, the importance of the proposal and its urgency relative to other current proposals, and the computer staff's estimate of the magnitude of the task. On the basis of its review, the committee will make a recommendation as to whether or not the project should be done and--if so--how it fits in terms of priority with other pending projects.

Recommendations from the user committee will then be reviewed by the vice presidents, who will make the final decisions regarding project authorization and priority. This is the level at which broader questions of computer policy and planning also will be decided, with involvement and recommendations from the user committee as appropriate.

In addition to an appropriate decision-making structure, this approach to resource allocation also requires establishment of criteria for judging both the merits and the priority of proposed projects (Bent and Enright 1990). One guiding principle which already has been proposed is that priority be given to projects which will bring in more students, bring in more money, or save the university money by increased efficiency. Attention also needs to be given to projects which serve current students, however, with the goal of increasing student satisfaction with the institution which in turn should lead to improved retention (Carroll 1988).

Summary and Conclusion

The university's new approach to approving programming requests and setting priorities among competing projects should have several distinct advantages over past practice. For one thing, it will provide access for worthy projects regardless of the size of the requesting department's budget. Secondly, it will make the process more public and provide a mechanism for review which is open to opinion from all major user areas. Finally, of course, there will be a "level playing field" in that no individuals or units will have any particular advantage over others as a result of reporting lines or historical practices.

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Administrative Resource Sharing Between Components of The University of Texas: Pilot Project and Future Directions

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ABSTRACT

Early in 1989 The University of Texas System established an office to support efforts to share resources for administrative computing. The network to connect the fourteen institutions was being completed and some electronic-mail traffic was going through. During the summer of 1989 The University of Texas at San Antonio undertook a pilot project to move all of our human resources and fiscal support systems to the main administrative facility at The University of Texas at Austin. By September 1, 1990 all targeted systems were in production.

The move to consolidate processing is being accomplished at the same time that distributed systems are being promoted. This presentation will cover the decision to undertake the project, the implications and challenges of this sort of distributed, networked environment, the technical questions yet to be resolved and the future plans for adding components and applications.

Administrative Resource Sharing Between Components of

The University of Texas: Pilot Project and Future Directions

ADMINISTRATIVE OVERVIEW:

The University of Texas at San Antonio is an academic component of The University of Texas System which has seven academic and six health units. Founded in 1969, UTSA opened for graduate courses in rented quarters in the summer of 1973. In 1975, we moved to a 600 acre campus and began admitting our first undergraduates. Now with over 15,000 students and 2,000 employees - including almost 500 faculty, 40 undergraduate and 22 graduate degrees are offered. We have one cooperative doctoral degree with The University of Texas at Austin, and are in the approval stage of another Ph. D. Program. We have grown rapidly in most areas but many of our administrative areas remain seriously understaffed. Understaffed areas include, but are not limited to our Data Processing, Accounting, and our Personnel Offices.

Only recently have we begun an attempt to organize and coordinate the development of our administrative systems. Until September 1, 1990, our Payroll, Personnel, Budget, Accounting, and Purchasing systems were either non-existent, or were separate systems with no integration whatsoever. The Accounting System was, until six months ago, a CICS emulation of the original Burroughs posting machine. Our Payroll System was an old CICS system recently re-written into Natural under ADABAS. The Personnel Program was the best that we had in the fiscal area. It had been written completely in-house, in Natural, and we had a computer literate Associate Director of Personnel who used the system as it was designed to be used. He wrote many of his own programs, and wrote them very well. Unfortunately, he is no longer with us. The budget system existed only in my mind, and in Symphony on my PC. In short, we had some fair to good fiscal and human resource systems, but no integration, and little on-line capability....and we were operating at a very high risk in several areas.

The Legislature of the State of Texas recently passed legislation mandating uniform Payroll, Human Resources, and Accounting Systems. All state agencies, including higher education, were faced with being forced into doing something for which we had too short a time frame, not enough staff to accomplish the job in the time allotted, and no resources to spend. We were also being forced into making our less than satisfactory, non-integrated systems feed into the State System without correcting the problems already existing in our own obsolete programs. Our Board of Regents was displeased because the data flowing from each institution was different and needed a great deal of reconciliation to provide management summaries for regental use. They asked our Vice President for Business Affairs, who was then our Acting President, if there was any way we could speed up the process, yet not go out and re-invent the wheel by buying new packages. Discussions with The University of Texas at Austin and UT-System officials indicated that UT-Austin could run UT-San

Antonio as a separate component on their IBM 3090, under their already existing fiscal systems. It was estimated that at full usage, we would occupy less than one-half of one percent of their CPU. We took this to be a window of opportunity--not only for us as a user, but for the entire UT System as a means of standardization while saving large amounts of the state's resources.

The advantages to us were quite apparent, and were immediate:

1. The immediate inclusion into an already existing and proven system.

2. Since UT-Austin had already been selected as a test site for the required state systems, we could buy time and not have to implement these changes into our less than perfect existing fiscal and human resource programs.

3. We needed no extensive, in-house development, that would take our limited programming staff away from other duties for projects that would actually be "re-inventing wheels."

4. We had investigated some proprietary programs and found none that would provide the unique solutions to Texas higher education problems, without large outlays of funds for modifications.

5. We would provide evidence to the State of Texas that we were serious about the savings of state money by our not purchasing or developing yet another redundant set of fiscal and human resource systems.

6. We would indicate to our Regents that we were serious about providing them, and the UT-System offices, with consistent information obtained at a much lower cost.

The problems we faced were:

1. **Lack of proper, up-front training.** The Personnel and Budget aspects of the conversion were really quite simple and required very little effort on our part. We had to be sure that the file structure and the data transmitted were common to both systems, which was closely monitored by one of our DP people and the Director of Personnel. I was closely involved with the Budget implementation, and other than a lot of data entry, I had no real problems. But, my previous system was PC based, so anything I got was a definite improvement. Payroll and Accounting, however, were so complex that the staffs in the two offices were overwhelmed. We have made very strong suggestions that much more up-front familiarization and training be done before implementation begins with other UT-System components who follow our lead.

2. **Lack of coordination of the implementation process.** I have suggested that each component coming under the System have a designated liaison at UT-Austin to handle all of the problems. The UTSA Payroll Officer spent untold hours on the telephone, first trying to determine who to talk to, then trying to get the problem solved. A liaison would be the contact person who would do all of the leg work in getting the problem fixed. That liaison, by the way, should be someone particularly well versed in the UT-Austin System. One other problem of coordination was the lack of understanding by the UT-Austin programming staff as to what their change to a program might do to someone else. As I stated earlier, this is a massive, very complex, system, and such problems may be just a cost of doing business that those of us with less sophisticated systems are unaware of.

3. **Lack of responsibility to our unit.** The programming staff at UT-Austin has done a fantastic job in bringing this all about. However, they are paid by, and are responsible to UT-Austin. If we are to successfully carry this concept of centralized processing to its expected end, something will have to be done to create more of a "service bureau" concept with those members of the DP staff involved in the project. UT-San Antonio is only 85 miles from UT-Austin, and when we needed personal assistance with problems, we piled into our car and drove there. Its less than two hours away. Since UT-El Paso is almost six hundred miles away, I doubt that they will want to solve their problems in that manner since their drive would be more than ten hours.

Our conversion is still not completed, but it is going to be successful. It will be successful because of the efforts of our DP staff, the departments affected, and because the long-term benefits of the System far outweigh any short term pain experienced during implementation. Our departments will have immediate on-line access to accounting information they recently could not get, or had to wait for. I anticipate a great amount of labor savings as we all become more familiar with the product. We have already implemented the electronic creation of payroll vouchers. On-line appointments of personnel will soon be implemented thus eliminating the need for typing thousands of multi-part appointment forms each year.

We made a conscious choice to proceed with this conversion even though it meant implementation before some of us were ready. Our Acting President last year recognized that if we waited for the new President to arrive we could lose a couple of years while the question and endless options were being pondered (new presidents tend to ponder endlessly.) Now, eleven months after his hiring, and about six months after we began the conversion, we are nearing completion. In another six months, I truly believe we will all look back and wonder what the problem really was, and we will be proud of what we have been able to accomplish in so short a time.

TECHNICAL OVERVIEW:

There are no truly easy conversions, but some are certainly more challenging than others. This was one of the best. From a technical perspective, such a cooperative venture had been on the horizon for quite some time, and the success of the project was the culmination of various preparatory steps.

UTSA and UT-Austin, along with several other UT components, began the 80's with the vision of shared resources. We built similar environments for administrative processing, centering on Software AG products, ADABAS, COM-PLETE and NATURAL, the fourth generation language. The UT-Austin applications were kept at a level beyond any that UTSA could afford, but they shared expertise, techniques, standards, with us generously. We also imported some of the software which they had written, such as their on-line job submission system. Very little effort was required to make our programmers productive when the conversion began and analysis was facilitated by the common understanding of data base issues.

The network to carry the transactions from our campus to the UT-Austin's mainframe was being finished as our project began. The creation of a network for administrative use followed the example of the academic network which connects the components with the Center for High Performance Computing in Austin, and the work was directed by the same System office. UTSA purchased a new communications controller (IBM 3745-170) with token ring adapter, anticipating a need for versatility as well as growth, and during the fall we were running at 56KB through fiber optic and microwave connections to the Data Processing IBM 3090 in Austin.

The last factor which make the technical work easier was one which all manuals on project management emphasize - we had the unwavering support of upper-level management. I was allowed to commit about two-thirds of the programming staff for the better part of nine months, and we were supported admirably by the Office of Management Information Systems of UT-System Administration, as well as by our colleagues at UT-Austin.

Technically, UTSA gained a great deal from the project:

1. Purchases which had been planned, but not yet funded, were given higher priority. For example, we acquired a mainframe laser printer to be compatible with the print being routed from Austin, so that forms (such as checks) and reports could be produced locally.

2. We established upload-download facilities between the two sites, a feature which took on greater importance as we began to try for integration between the two data bases.

3. The network was made available and the transfer rate boosted earlier than had been anticipated. Because of our success with the network connection, we will soon be a trial site for a remote token ring connection.

4. UTSA has been able to acquire some products under enhanced system-wide contracts.

5. I was able to divert programming resources from projects, such as HRIS, which were scheduled for future implementation. Because UT-Austin had already built the software for that system, we were able to "piggy-back" on those reporting modules. Our programming staff was able to devote their efforts to the conversion and to building systems which UTSA needed, but we hadn't been able to find time for. For instance, we were able to build a student loan system which integrates with the financial aid and bursar modules of our student records system locally and with the Accounting system in Austin.

There were the usual conversion challenges of data definition, incompatible processing rules and formulas. But the technical challenge that was not completely anticipated was: how do you integrate two data bases that are physically 80 miles apart for on-line transactions? Many of the financial records associated with students should have timely interaction with the Accounting system. Half of the data pertinent to faculty are stored in Austin, half in San Antonio. We have hopes that in a year or so a product will be introduced which makes two ADABAS sites into one conceptual data base. Until then we will be designing and writing systems that load data in batch mode to the mainframe where processing will take place. We have already experienced some double updates and mistimed loads.

Ours was the pilot project in a new era of resource sharing, but within weeks of our start date, other projects within the UT-System had been approved:

1. Three of the medical components, using ADABAS and NATURAL, are cooperating to build a human resources/payroll system to be located at a central medical site.

2. Three academic components have shown interest in converting to the UT-Austin financial systems and UT-El Paso has started the preparatory work.

3. A prototype for a system-wide Executive Information System has been built.

The smaller components, such as UTSA, can look forward to much more complete and sophisticated information systems than we could ever have built on our own.